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SESSIONAL PAPERS

OF THE

ROYAL INSTITUTE OF BRITISH ARCHITECTS,

Incorporated in the Seventh Year of William IV.

PATRONESS . . . HER MOST GRACIOUS MAJESTY THE QUEEN.

PATRON . . . HIS ROYAL HIGHNESS THE PRINCE OF WALES.

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OPENING ADDRESS BY THE PRESIDENT,

ALEXANDER J. B. BERESFORD-HOPE, M.P., LL.D., F.S.A.

At the Ordinary General Meeting of the Royal Institute of British Architects, November 6th, 1865.

GENTLEMEN,—It is a relief to your President to feel that the Address of 1865 follows upon a year of rest—a year which, while it has not given birth to any particular reason for exultation, had, up to three weeks since, been equally devoid of any remarkable cause for sorrow and condolence. If there has been a Great Exhibition this year, it was one which was parted from us by St. George's Channel and the Race of Holyhead; and the exigencies of a huddled-up session, followed by a general election, have kept the collective wisdom of Parliament off from the fascinations of any art crusade, or of any art hurray—things which sometimes run somewhat closely up into each other. This lull, temporary as it may prove, may be used by us as an opportunity for reviewing calmly and fearlessly the position of this Royal Institute, as the general exponent and mouthpiece of English architecture, and for considering the condition of our national architecture itself as it may be mended or the reverse, according as this Institute acts with unity, vigour, and wisdom.

I am ambitious for the honour and usefulness of the Institute, and as the result of this ambition I decline to rest where we are. We are all doing our best, and yet the Institute, with its ample prerogatives, its Royal Charter, and Royal Medal, its powers of examination, and its various prizes, with the distinguished names that belong to it, and the vast mass of most interesting architectural lore which it has conveyed to the world, has not yet risen to the summit of its duties and of its pretensions. The Institute ought to be, without rival, and without demur, the central regulating areopagus of architecture,—of architecture as a science, and architecture as an art; of architecture as practised by its professional votaries, and as studied by the amateur,—as loved by both,—throughout this imperial realm. The time should come when the absence of those letters which denote some grade in the Institute from the name of any one who practises architecture should be as much cause for enquiry as the absence of academic distinction from that of the clergyman who has the misfortune to be a "literate." Do not mistake me, and imagine that I am the mouthpiece of any policy of aggression; least of all that I wish to crush the free art-life which has given birth to so many other architectural and semi-architectural societies, all instinct with the energy which the pure love of science and beauty inspires, and many of them further nerved up by the conviction of a mission to fulfil and a dogma to teach. I wish them all prosperity and all liberty; at the same time I desire that they should all act as members of one system, moving harmoniously round one centre, co-operating as the volunteer forces of the great architectural army, looking up to this Institute, not as the tyrant whom they are pledged to bring low, but as the *Alma Mater*, ready to give all fostering care, at the cheap price of unsuspecting confidence.

We must not, however, shut our eyes to the difficulties attendant on the realization of such an idea. I believe that in accepting it we should have to extend our borders, and to create one or more fresh classes of membership for the proficient in arts related to, but not identical with, architecture. This enlargement would of course entail increase of labour; but as it would involve increase of members also, more backs, no doubt, would be found broad enough and willing enough to bear the honourable burden. There is in particular and emphatically one phalanx which I earnestly desire to see absorbed into

our body in larger proportions than they have as yet been. These are the architects who, because the buildings which they construct are pre-eminently massive, because they are buildings mainly devoted to the developement of the grand material interests of the nation, because their measurement may be the furlong and not the yard, therefore abjure the name of architect to borrow the incongruous appellation of engineer. Do not mistake me, and imagine that one single thought derogatory to the grandeur of those constructions or to the genius of the men who planned them crosses my mind while I pen these sentences. The man would be unworthy of the name of Englishman who was not proud of them. All that I say is that I demur to the appellation under which their constructors have produced them. What is an engineer? I look to Johnson, and he tells me: "Engineer, (1) one who manages engines; (2) one who directs the artillery of an army," with a reference to Shakspeare's engineer hoisted on his own petard. I seek further help from Richardson, but he only provides me with an illustration borrowed from South: "In like manner, as skilful an engineer as the Devil is, he will never be able to play his engines to any purpose, unless he finds something to fasten them to." We all know and we all admire what our great civil engineers have done, and we lump all their grand works under one term, and call it "engineering." But it is surely just as incorrect to designate every thing that Stephenson or Brunel accomplished engineering, as it would be to call all the works of Michael Angelo architecture, or painting, or sculpture. Michael Angelo was great in all constructive and plastic arts, but the versatility of his greatness did not bring those arts nearer together in themselves than they were before. So the patriarchs of modern engineering have mapped the roadways, invented the rolling stock, and designed the buildings, all of which in different ways go to make up a working railroad, just as an old architect might have built, painted, and carved a cathedral or public hall. The old architect thus showed himself to be architect, painter, and sculptor. So the civil engineer proved himself to be a surveyor, in laying out the line; an engineer, properly so called, in constructing the engines; and an architect, in designing viaducts and stations. The name surveyor has no doubt gone out of fashion as applicable to the person who plans any very large works, and if the world prefers to substitute the designation engineer, I do not object. My immediate point is that the world should not continue to deceive itself with the belief that Stephenson and Brunel were not architects—self-made architects, it may be, just as the mathematician Wren and the physician Perrault were self-made architects, but, like those worthies of the seventeenth century, great architects. The notion that because to them architecture came without the usual training, therefore the engineer is for the future to dispense with the trained and learned architect for the construction of buildings whose monumental elevation gives its colour to our age, is a wrong on our whole craft of architecture, against which it is right to make an earnest protest. But you will ask, what is this protest worth, and what is the practical remedy with which you wish to follow it up? How will you mend the state of things by inducing a number, more or fewer, of our civil engineers to join this Institute? Be assured that I propose no such trivial palliative. I wish the world, eager enough as it is in general for subdivision of labour, to see that in its creation of the new profession of civil engineer it has been false to its own principles, by overweighting the responsibilities of a calling which, growing as it has done with the growth of modern science, may be almost called a new discovery, with those of the old time-honoured one of architect. The mischief of this course is only making itself evident:—

"Decipit exemplar vitiis imitabile."

The great engineers overwhelmed us with the rough grandeur of their huge style; able but less eminent successors may but stifle us under the weight of heavy disproportion and unscholarly nakedness of detail.

The question of architect or engineer is not a mere fight of words. There are engineers who will

build commendable structures, and architects whose works may be contemptible. But men's merits do not affect the value of principles. Architecture is the calling which, next to that of poet, dives deepest back into the young world's gulf of ages. As it moves on it spins out as part of itself that golden chain of association which ties together the ancient and the new, the foreign and the home-born, the beautiful and the useful. So an architect's education should be based on the broad foundation of history, science, and imagination. The liberal languages and the literature of other lands and times should be storehouses out of which he may bring the treasures with which he makes his handiwork loveable and true. Engineering repudiates the past, or uses it to point a self-exalting contrast. I do not say that engineers themselves do so, but this repudiation is the necessary price at which the constructive part of the engineer's business can any longer be formally divided from architecture.

Is it not, then, more necessary for us to dare to speak the truth, and to believe that our engineering friends will bear to hear that truth. We attack no vested interests, we depreciate no living man's work, when we say that the vast monumental structures of this glorious nineteenth century ought pre-eminently to be designed by men who have, as architects, learned how past great architects grappled with bigness, men who have studied Egyptian Thebes and the Colosseum, the Pont Du Gard, the Castle and Bridge of Avignon, Conway and Durham Minster. Let it be our office to revindicate for architecture all works of piled material, either containing chambers or else cast in architectural forms, whether they be of arched or trabeate construction. The engineer legitimately claims the level and the gradient, the earthwork, the roadway, the culvert, and the breakwater.

These considerations lead us to a topic which ought on its merits to be faced within the Institute, the relation of the society with the Royal Academy. It is one of the questions which it is the fashion to call delicate, but I see nothing delicate about it, if it be handled in candour and good temper. I approach it in the spirit of the utmost good will towards the Academy, although believing that I best show my good will by declaring myself a believer in the desirability of certain reforms within that distinguished body, which I desire to see always filling the exalted position to which it has the means of doing justice, so long as it continues to realize that rank and wealth involve responsibility with corporations no less than with men. The dualism involved in a Royal Institute of Architects such as I have forshadowed, alongside of a Royal Academy of Arts including architecture, is, I freely grant, at first sight, puzzling; but I flatter myself that I see the way of reconciling with advantage to each other, and to pure architecture, as well as to the mixed arts dependent on it, the continuous co-existence and the progressive development of the two great societies. Consider the broad differences which respectively mark off the constitutions of the two bodies. Both are, speaking generally, elective; but the election at the Academy means the choice of one distinguished man from out of many; while with us it is little more than the safeguard against improper nomination. Otherwise the Institute is in theory the collective body of all architects; the Academy a selected council of artists, among whom architects only form a certain, and I venture to add, too small a portion. But then we may be told, let the number of architect Academicians and Associates be augmented, and then the Institute might be suppressed. Emphatically *no*. The Academy is a great advantage to architecture—what that advantage is I shall proceed to point out; but the Institute is a necessity. I have just been revindicating for architecture much which it is the fashion to call engineering; but this revindication strengthens the fact that, while architecture is an art, it is also what, for want of a better term, I must call a business or craft.* It is this perpetual combination of the *utile* and the *dulce*, the perpetual necessity of adapting style, ornament, and proportion to construction, and of so manipulating construction that it shall not sin against beauty

* *Profession* applies to the person who professes, and not to the thing professed, and will not, therefore, serve my turn.

of detail or mass, which makes architecture the peculiarly complicated and scientific thing which it is—an art, and something more than an art. It is this which makes it so fascinating to those who are really embraced by its spirit; while, on the other hand, it deters so many amateurs, who find it very much easier to set up as connoisseurs of painting and sculpture than to risk being discovered as incapable of apprehending the mechanical exigencies of building. Again, the architect has also, as a member of the commonwealth, charged with care for the life, health, and convenience of its various members, to make himself at home with sundry legal matters of which an Academy of Arts could have no cognizance, but which are the legitimate function of an architectural corporation.

Of this mixed craft and art then the Institute can be the efficient regulator, as the Royal Academy, a purely artistic body, cannot be. On the other hand, something like the Academy is just what is wanted for painting and sculpture, and being so for these two arts it was seemly that it should also include architecture, otherwise the exclusion would have seemed like a denial of its claim to be a liberal art. Nay more, at the time when the Academy was founded and architectural art in this country was passing through a time of great depression, I have no doubt that the step was eminently salutary. I proceed further, and say that, even now, when architecture occupies in every way a very different position from what it did in the early times of George III, we are more likely to be the better than the worse for the Ephorship of the Academy. Still, it is well that we should know what the Academy can do, and what it cannot. It cannot handle the many professional matters which constantly come before us. It can give lectures on the theory of architecture; it can teach a school of students on the art side of architecture; it can give prizes. We can also do all this, and we do a great deal of it. We shall do more when our School of Technical Teaching, on behalf of which a mixed Committee was organized, gets fairly to work, as I trust it may do this session. Moreover, the Academy can and does specially do two things, neither of which we are so capable of carrying out. The first of them is not a part of its specially architectural functions, but it is of essential importance to the architect. The Academy possesses a life school, in which even the architectural student can acquire that power of drawing the live figure, which I am convinced ought for many reasons, direct and indirect, to form a portion of the *curriculum* of every one who desires to master architecture as an art and not as a business.

The next thing which the Academy can and does do, is to hold an Exhibition. No doubt if we had as large an income relatively as the Academy, we could hold our Exhibition, and no doubt if the gallery in which we held it were one of the public buildings of London, we could make it a much better exponent of architecture than the Royal Academicians have ever made theirs. It would be affectation not to say what we all feel, that the architectural portion of the great annual display fails in doing justice to architecture. The best evidence of the shortcomings of the Academy is to be found in the independent Architectural Exhibition, which has been carried on for several years with so much zeal, and has for a considerable time been held on the ground floor of the building which lodges us. Still we must all confess that this independent Exhibition does not in itself completely fulfil the requirements involved in an annual London display of architectural progress. The reason is not far to seek, and it is no fault of the promoters of that Exhibition. Imperfect as our representation in Trafalgar Square may be, it still stops the way; it has prestige and antiquity, and so, while defective in itself, it keeps the younger enterprize from filling the void. Accordingly we say, let the Royal Academy, while seeking a new habitation, bear in mind that it can win both honour and popularity by making its Architectural Exhibition each year a vigorous reality, alike for the general visitor and for the student. I am sure if it embarked on this course, it would find no heartier co-operators anywhere than within the walls of this Institute.

In the evidence which I gave before the Commission which sat in 1863, to enquire into the condition of the Royal Academy, I urged its aggregating to itself associates out of the ranks of working artists.

If it should take any such step, we, I am sure, in no spirit of rivalry, would also consider how we might enlarge our ranks, so as to admit the members of such professions into some regulated membership.

I have adduced instances of the peculiar work which we might wisely leave to the Academy. Let me now refer to two fields of labour of our own, in which we especially can do much good, but which would be quite beside the scope of the Academy. Air and light have an importance at once legal, sanitary, and architectural. That the Institute should have had a Committee sitting on this question is a matter of unmixed congratulation. Only let me offer one caution—be not content with simply making a report, once for all, on a matter which must be continuously watched through its many ramifications.

The conservation of Ancient Monuments, on which also we have a Committee appointed, is happily a responsibility which is now universally recognized. But it is one thing to recognize and another to perform. A former generation destroyed without shame and without consciousness. Our present generation is too often in the habit of changing and spoiling and bedizening, and then of asserting with a complacent smile that it has only been restoring. Some of us have had our attention lately called to the painful fact that, with the very best intentions, the authorities of Lincoln Minster have lately been flaying alive the surface of that noble structure. Professor Willis, at the late Archæological Congress at Dorchester, laid down, in discoursing of Sherborne Minster, the true and exact law of treatment to which churches ought to be subjected—conservative alike of the fabric, and yet regardful of the solemnity and the exigences of their still living use. The paper put out by our Committee takes up the same position. Neither this paper nor the Professor handled the restoration of secular buildings; and so I hope we shall not pause midway, but instruct the Committee to give the possessor of every castle, every hall and manor house, and every grange, practical and straightforward advice how to live and let live, without damage either to his own health and comfort or to his archæological allegiance. No doubt this is a much more delicate problem than that of church conservation, where the fabric is either restored within its original unchanged walls, or else merely enlarged by aisle or transept, in accordance with the original *motif*, while house conservation is complicated by ever varying necessities of family, and social station, of ventilation, drainage and smoke, for which no law can be laid down which can systematize the amount of necessary alteration, and therefore it is all the more necessary that some code of general principles should, if possible, be provided. The necessity has become more apparent, since, in an ever increasing ratio, farm-houses situated in counties proximate to the capital, or to chief towns, are snapped up if near railroads and turned into villas. These houses are frequently interesting specimens of Mediæval or seventeenth century architecture, sometimes perfect and sometimes disguised, which the judicious restorer would preserve and enlarge, while in the hands of the ignorant builder they would be doomed to hopeless destruction.

This sketch of the relations of the Institute to external powers would not be complete if I did not comment upon that Ministry of Public Works which has gradually grown up out of the old office of Woods and Forests. It has from time to time been argued, that, in order to avoid the vacillations and inconsistencies seemingly inherent in a fluctuating change of chiefs, there ought to be a permanent head of the department of works. I am decidedly opposed to any such arrangement. Not only is a permanent head to a great department antagonistic to our political instincts and traditions, but I believe that in this case the innovation would defeat its own object. The man who is originally appointed must have some art-notions or other of his own, or else he is palpably unfit to get the place at all. These notions may be good or they may be bad. Anyhow, if he is irremovable they will be ineradicable, to the discomfiture of all opposing schools of thought. At best we should perpetuate sameness and tameness, at worst ever recurring clique and manœuvring. Besides, those who argue for the permanent chief, forget that

in all public offices there is an element—often an overpowering one—of permanence in the irremovable second man. My own remedy would be based on the opposite principle, of exalting the attributes of the Minister of Works, treating his post as a necessary component, not merely of the administration, but of the cabinet, increasing his responsibilities, multiplying his inducements to do well, and withal hedging him round with such constitutional safeguards as a perpetual oversight by the Institute and the Academy, not to mention the still more severe and formal one of Parliament itself.

The Commissioner of Works is sometimes in the cabinet and sometimes not, and whether in or out of the cabinet he is in theory only a subordinate of the Treasury. This is plainly wrong, for it pulls down the importance of the office, and consequently checks young men who are going into public life from really studying art questions as a channel of political advancement, not much inferior, in its openings, to heavy statistics or colonial grievances. Then modern educational developments have accumulated a large amount of mutual responsibilities, more or less referable to architectural art and its cognate pursuits, between the State and the people, which, if imposed upon the Minister of Works, would fill the hands of the office and of himself, and justify the suggested increase of his dignity. But by some freak the wise men, who busied themselves a few years ago in re-arranging the public service, passed over the First Commissioner, and instead created an anomalous semi-minister, under the ambiguous name of Vice-President of the Committee of Council, to divide his time between high art at South Kensington, and parochial school squabbles in general over the remaining kingdom. I give nothing but praise to the noble collection at South Kensington, while, at the same time, I say that its wants have no relation to the department of state under which it is placed, and I claim that this museum, with the appendent art schools, would more congruously be made a function of the Minister of Works than of the Vice-President of education. Let the departments be thus re-distributed, and the need for the latter never very well understood nor popular office falls to the ground. For the purpose of moving the really educational votes in the House of Commons, the Lord President himself, rid of his art responsibilities, would want, and ought to have, a Parliamentary under-secretary, but that official need not be of weightier calibre than the Secretary of the Poor Law Board. If the Minister of Works were expanded, as I propose he should be, into an undoubted and constant member of the cabinet, he should also have assigned to him a Parliamentary under-secretary, to move estimates and make explanations; and then the department of works might be filled by a peer, if the fitting man turned up in the House of Lords. We should know how we stood towards such a minister, as we do not with respect to the actual First Commissioner. It would then be our duty, in conjunction with the Royal Academy, to see that, in the remodelling of the office, a definite standing should be given to those great societies, as the perpetual Attorneys-General and referees of architecture at the bar of the administration. Thus the liability of the office holder to be changed would check clique, and the fixity of his standing council, would obviate fickleness and inexperience.

Let me now say a few words upon a detail of considerable importance to architecture,—the International Exhibition which it is proposed shall be held in Paris in 1867. Many here present to-night no doubt recollect the trouble that was taken in this Institute, and elsewhere, to secure an adequate recognition of architecture as the great material symbol of civilization at the London Exhibition of 1862. The result was not all that could have been wished for; nevertheless much was achieved on the British side,—the only side with which we had to do. Not only a highly interesting and overflowing gallery of architectural designs was furnished, but at various points of the ground floor, notably in three special courts, and all up the nave, such large fragments of buildings in progress as were noteworthy by reason of form or detail, and even smaller buildings—like drinking fountains—in their integrity, were exhibited. Compendiously architecture, as architecture, made itself felt on the British

side of the Exhibition, as it would not have done if the professors and the lovers of architecture had not in time bestirred themselves. I turned accordingly with anxiety to the prospectus of the French Exhibition, which has just been re-printed and circulated from South Kensington, to see if it indicated progress or retrogression since 1862 in respect of the due recognition of architecture as an elemental idea in the general arrangement. It is my duty to report that I am filled with grave apprehensions that, if that programme is to be acted upon, we shall find that recognition even less complete than it was in 1862. Of course allowance must be made in reading this document for that love of playing at scientific arrangement, which among foreigners sometimes tends towards something not very unlike pedantic fussiness. In one respect I am glad to say that the Exhibition of 1867 is a marked improvement upon its predecessors—it will be truly universal—by breaking down the geographical divisions which converted its predecessors into what a man given to playing upon words might have called a map of the world upon *Mercator's* projection, and by ranging class against class in direct cosmopolitan competition. Here, however, I must pause in my praise, looking at the programme with an architectural eye. The prospectus ranges the exhibition in ten groups, subdivided into ninety-five classes. What an architect might have marshalled together under the great group of architecture is dotted up and down the list as follows: Group 1 is entitled “Works of Art,” and divided into five classes, of which No. 4 is headed “Architectural Designs and Models,” to be placed in the first gallery of the building, and is thus epitomized:—“Sketches and details; elevations and plans of buildings; Restorations based upon existing views or documents.” I should have mentioned that in a previous class termed “other paintings and drawings” occur “Cartoons for stained glass and frescoes,” while there is another class of “Sculpture and die sinking” which may cover architectural sculpture, which has otherwise no distinct place. Class 9, in group 2, introduces us to photographs of buildings. The third group is headed “Furniture and other objects for the use of dwellings,” and includes thirteen classes, which in their turn include a mass of miscellaneous articles, which it is difficult to imagine could not be better subdivided. The “Upholstery and decorative work” class starts with “Bed furniture and stuffed chairs,” and closes with “Furniture, ornaments and decorations for the service of the church.” The next class is designated “Chrystal, fancy glass, and stained glass,” and also runs from the secular to the sacred, from “drinking glasses” to “stained glass windows,”—the cartoons for such windows being, as we have seen, ever so many classes back. After exhausting other materials the classifier seems to have thought that the time for metal had arrived, and with a true system-monger's instinct he begins from the beginning with a class of “cutlery—knives, pen-knives, scissors, razors, &c.—cutlery of every description,” and goes on to recapitulate in subsequent classes “church plate,” “plate for the dining table,” and “statues and bas-reliefs in bronze, cast iron, zinc, &c.” I am sure you will admire the philosophic rigour of the classification, which ranges “razors and bronze statuary” side by side, and calls them both furniture. The anti-climax of the furniture group is a class of leather work and wicker. A long sweep brings us to the eightieth class of “Civil engineering, public works, and architecture,” (architecture you will note coming after civil engineering) in the large group of “Apparatus and processes in the common arts,” in which a miscellaneous catalogue tails off with “Models, plans, and drawings of public works, bridges, viaducts, aqueducts, drains, canal bridges, &c., lighthouses, and public buildings for special purposes,”—as if there could be a public building without a special purpose!—“buildings for civil purposes; mansions and houses for letting; lodging houses for the working classes, &c.” I ask you, as men of common sense, if this elaborate catalogue, coming where it does, and contrasted with the vague generalities of the so-named architectural class in group 1 does not indicate the subordination of pure architecture to so-called engineering? Another jump brings us to the last class but two, No. 93, which it seems is to be placed in the “Park,” and is

termed "Examples of dwellings characterized by cheapness, combined with the conditions necessary for health and comfort," and is divided into two heads; "Examples for dwellings for families, suitable to the different classes of workmen in each country," and "Examples of dwellings suggested for factory hands in cities or in the country."

We shall be but guests at Paris, and so neither courtesy nor possibility allow us, I suppose, to make any formal opposition to a scheme already so elaborately prepared and officially published. We can only bear it and make the best of it. As your President I have the honour of being one of the British Commissioners, and I need hardly tell you that my most strenuous exertions shall be devoted to furthering the good cause of Architecture. I should advise the formation here at as early a date as convenient of an Exhibition Committee. This Committee ought to originate within the Institute; but, I think you will agree with me, that it might well contain an addition of co-operators from the cognate societies. If such were formed it would be my constant duty and pleasure to be the representative of its wishes at the Commission. In any case, let every British architect, let every British architectural sculptor, metal worker, wood carver, glass painter, and ceramist, gird himself up for a victory upon a foreign soil.

I must now offer a few remarks upon that which is even more important than the details of architectural administration, namely, the condition among us of that art in whose behalf alone this administration possesses any value. I am glad to be able to speak in a hopeful tone, and I am glad that the improvement which prompts that tone is one upon which I can insist without trenching on that impartiality which the position, in which you have placed me, demands. To whichever side the victory in the battle of styles may verge, this much is certain that the truth of architecture has been made more precious in our eyes, and her fertility of resources has been enhanced in consequence of the conflict. All sides are now agreed that material ought to be real, and all sides are anxious to enlarge the list of real materials. Variety of colour and variety of material in the same building has by this time become a question merely of degree; the sky line is appreciated and studied, the catalogue of plants available for the working artist's chisel is no longer limited to the acanthus and the honeysuckle. Finally—The painter and the sculptor are, as in great old days, both of them welcomed as brethren of the architect, and co-operators in the broad idea of the completed construction—not merely as the parasites who are to fasten on the finished pile.

No doubt, with the single exception of the recognition of the sky line, the acceptance of these incidents does not amount to the demonstration of improvement in that which is of the chief importance in architectural art,—composition. It is possible to conceive the world's noblest design carried out in cement, while the vilest nightmare might be embodied in a façade of marble and serpentine, bristling with sculpture, and bedaubed with gold mosaic. Yet, indirectly, the consciousness of variety in his materials, and in his permitted details, and the responsibility thus laid upon him to make his use of all, must strengthen the heart and heighten the intellect of the composer, for opportunities make men, as often at least as men make opportunities. As far also as truthfulness of material comes into question, a tender conscience in avoiding shams will also breed a manly truthfulness in the composition of the mass; for it is untrue to nature that the man who sees no vice in palming off plaster for stone and marble, and graining for oak, should be very scrupulous about the proportions of the mass, or the purity of his details, should he see a short and easy way open to vulgar popularity through the lavish employment of gaudy and meretricious forms.

If what I have said be true, we may expect to see the fullest proofs of the improvement in London and other large towns. Of the condition of London architecture, I am willing to think more favourably and anxious to speak more hopefully than it is the fashion to do in some quarters. Undue depreciation

is as little clever or original as undue laudation, while it is, if possible, even easier. No man is more conscious than I am of the infinite amount of lost opportunities which have to be made up in London, or of the ineffectual manner in which these opportunities have too often been taken in hand. But of late years, at all events, London has been shaping itself into that form of beauty, of which alone, from many reasons, foremost of them our civil liberty, she is at present capable—the beauty I mean of picturesque variety. We know how under different political circumstances foreign cities are forfeiting their old picturesqueness in order to don the aspect of official regularity. London, on the other hand, is growing out of an irregularity of plan in which, speaking generally, there was no architectural character into one in which irregularity has become picturesque. Of course a vast number of the new London buildings will not stand criticism. But in which of the large old picturesque cities do we find the majority of the houses really good architectural composition? It is the ensemble and not alone the merit of each component which gives the general effect to cities, such as Bruges or Amsterdam.

The first feeling of the stranger, who comes unexpectedly upon the sumptuous palaces, which are for example growing up in that dingy and narrow thoroughfare Lombard Street, is probably regret that they should have been dropped down into a corner, which seems to preclude the appreciation of their merits. On second thoughts he may, however, pluck consolation from the reflection that it was in narrow thoroughfares like Lombard Street that the buildings which give their fame to cities, such as Verona or Genoa, were planted, and that the picturesqueness which the traveller finds to admire in them is in no little degree enhanced, whether truly or in imagination, I do not now concern myself to ask, by the narrowness and irregularity of the ancient streets of these cities. Perhaps in coming time, when London shall house by house have been rebuilt, as we are now rebuilding it, and when a little of the mellowing of time shall have passed over those buildings, the curious traveller from the antipodes may visit London, not to sit upon the broken arch of London Bridge, but to drink in notions of old world picturesqueness from the houses of Lombard Street and Mincing Lane.

In what I have been saying I have confined myself mainly to the developement of domestic architecture upon existing lines of streets. If, for example, I were to speculate upon the razzas and rebuildings which follow on the importation of railroad termini into the heart of the town, I should engage you in a maze of conjecture of which I feel that I have no time to seek the clue. The architectural future of the Thames Quay is a problem which ought to fill us with anxiety: the material advantage of the great enterprise is beyond a peradventure, the artistic gain which may be made of it, remains to be gauged. It is a curious reminiscence that when the Thames Quay was first advocated in the House of Commons some forty years ago by Sir Frederick Trench—a name to be always had in honour for the courageous and constant zeal with which its possessor continued to advocate an improvement which he was not destined to see completed—it should have been opposed by Sir Robert Peel in the interest of the streets running down to the Thames, and supported by Lord Palmerston. Were I to enter upon the new phase through which religious art is passing in London, as well as elsewhere, I should have still more to say, which, however, I think it is better not to say. Were I further to talk of that feeling of respect for the ancient monuments of the metropolis, which has prompted so general a restoration of them, my anticipation of London's architectural worth would be still further enhanced. The epoch which witnesses simultaneously the decoration of St. Paul's, of Westminster Abbey, and of the under-croft of St. Stephen's Chapel, the restoration of the Tower, and Guildhall, of the Temple, Austin Friars, and St. Bartholomew's Churches, and the Savoy Chapel, and the resurrection of Charing Cross, is one in which the spirit of reverence for old forms of beauty must be abroad.

Next year the Archæological Institute holds its congress in London. It is well that we should be able to meet it with a confident spirit in a city which has not been untrue to its inheritance of ancient

buildings. The pursuits of this society are to a great extent parallel with our own, and I am sure we shall cordially welcome a gathering of which a main object is the complete investigation of the monuments of architectural antiquity in and around London.

I have been the more anxious to invite your attention to the architectural condition of London, because next session will in all probability decide whether the capital is to be enriched with a great public building of undoubted excellence, or afflicted with one of costly mediocrity. The nation is going to rebuild its Law Courts, and mass them in one pile. I do not now question the site selected. This is, according to the modern phrase, an accomplished fact, and it is enough to say that the area chosen is one well suited for a magnificent and commodious structure. I say nothing, though I might say much about the method to be adopted in selecting the architect. I do not claim to dictate the style, for I trust that whatever style may be chosen, architectural truth will not be sacrificed. If the building is to be classical, classical must not be interpreted to mean a modern house, with floors below, and chimney pots above, ill concealed by barricades of pillars, fencing off light and air from the unhappy occupants. If it is to be Gothic, Gothic must not be handled as the style which enforces narrow casements and diamond panes, turrets that lead to no where, and gargoyles that spout no water. Under any condition we claim a building which shall tell the tale of its own destination, and indicate the puissance of the nation in whose behalf it has been raised. We claim—what Manchester, out of merely a county's resources, has so generously provided—a palace in which the disposition of parts and the ornamentation spring from the destined use; in which the law courts and the great hall shall stand out from the general structure; in which the corridors shall be lofty and wide, the staircases easy and dignified, the subsidiary chambers many and accessible; acoustics, light, and warmth, and ventilation all well attended to, and after all these utilitarian requirements have been satisfied, in which proportion and material shall all be of the choicest; in which form and colour, sculpture and painting, shall combine to beautify the pile and leave it a living chronicle of the great growth of that sublime spectacle—the world's wonder and envy—English law, fearlessly and solemnly administered by English judges without spite and without favour, unbiassed by Crown or mob, or armed battalion. If the building shall fall short of this ideal, great will be the scandal and the misfortune, on whomsoever's back may lie the blame of the miscarriage.

If it were only for the proximate erection of the Palace of Justice, next season would be an important one to us. But in this age of changeful activity it is not needful to look to any one incident as the text on which to preach more vigilance, greater exertion. We are all proud of our Institute; we all acknowledge its importance; we all are conscious of what it has done, and of what it might do which it has not done. Let all of us then, laying aside self-seeking and mutual jealousy, sloth and fear, unite with one heart, cheerfully and magnanimously to promote the best interests of architecture as a science and as an art, and to build up this Institute as a guarantee to ourselves and to the world that architects shall respect and the public acknowledge the just claims and genuine character of that science and that art.

PROFESSOR DONALDSON, Past-President, rose and said: After the manner in which the President's discourse had been received by those present, he should not presume to offer one word in eulogy of the various topics introduced, of the manner in which they had been treated, or of the interest they possessed in the minds of those who had listened to them. The President had handled the several subjects in a broad and distinct way, with much instruction to the members, and he doubted not it would be to all a stimulus through the coming session to carry out the principles so ably laid down. There were one or two matters which he (Prof. Donaldson) regarded as of peculiar importance, on which he would venture

to say a very few words, particularly on the subject of Architecture in reference to Science and scientific associations, and Architecture in reference to Art, and its connexion with art institutions. In the first place the President had alluded to engineers, so called, as essentially forming a part of the architectural body. That was quite true. The difference between the two professional bodies had arisen from various circumstances, but the science of engineering had taken so large a development, and assumed so much importance in the present day, that it was thought worthy and just to those who cultivated that special branch of science, that they should be recognised as of a distinct class, worthy of the attention of the public, and which should be called by a separate term. The term "architect" was honorably recognised by engineers. They found that naval architecture formed a portion of the establishment of the Admiralty. There was in existence an Institute of Naval Architects, showing that the science of conception, the science of invention and combination of parts, was one of very high value, and sufficient for them to claim the title of Naval Architects. It had long been his feeling to combine in the architectural body all who had produced works having reference to architectural beauty, in size of architectural importance, or which possessed any architectural sentiment at all; and from the very origin of this Institute he had been desirous to get in, as members, those engineers who had erected buildings, which might be called monumental edifices. They might be defective in one part or other, in the mass or in detail; but still there were large masses of railway stations, magazines in the dockyards, and workshops in the Government establishments which evinced considerable architectural ability. The buildings erected by Sir John Rennie in Plymouth dockyard, in particular, might be referred to as being of a fine architectural character, and if left as fragments of a past century, would be looked upon as remarkable erections of the period. Therefore, whether it was engineering in the civil service—whether marine engineering or military engineering—whatever it might be, to them the name ought to be worthy, and the question they should ask themselves was, "Has that man produced an architectural work worthy of placing him in the position of being a member of this Institute?" Away with jealousy as to terms! They should recognise that man as worthy who had done a worthy work! There was another consideration to which the President had called attention, that was with reference to the Royal Academy especially. It was to him (Prof. Donaldson) matter of deep regret that architects had not sufficiently looked upon their position as artists, and that they should wish to disassociate themselves, so much as they had done, from the Royal Academy. When a young man he passed three years in the schools of the Royal Academy. It was a very happy period of his life. He formed connections and associations then, and he believed gained knowledge in art from being connected with young men of that period, who had since distinguished themselves as painters and sculptors. It was therefore, in his opinion, most desirable that the young members of their profession should, by associating in their studies with painters and sculptors, and in an atmosphere of art acquire knowledge as artists, beyond mere technical knowledge as architects. He felt that the Royal Academy was to be regarded as an *academia artis*, where art should be taught in its very highest culture. In this Institute they encouraged the study of architecture, and gave premiums and rewards for drawings of designs, but they had no pretensions as a school to teach students how to compose, how to draw, and how to improve themselves as artists. The meetings of the Institute were periodically held, and the students had the privilege of having practical papers read, and also the discussions that took place upon them; but an *academia artis* they certainly were not. It was most desirable, as the President had said, that they should, if possible, draw to them and associate themselves with members of other kindred bodies, as the best means by which the young members could raise themselves to the heights of their profession. He quite adopted the views of the President, that they should consider those two subjects in the view he had expressed in his address, and he was sure their own profession and that of the engineers would be great gainers thereby. Another subject mentioned by the

President was that of the Architectural Exhibition held with reference to the Royal Academy. He (Prof. Donaldson) had always regretted that that architectural exhibition had ever been established at all. It had never been successful, supported only by eleemosynary aid to supplement the entrance fee paid by visitors. He was sorry the Academy did not, in the first instance, hold out sufficient inducement and afford proper space for that exhibition, the absence of which had no doubt partly contributed to the failure there of a display worthy the profession. He was also sorry that architects themselves had neglected even the scanty opportunities afforded them by the Royal Academy, and had not sent their works in, so as to have forced the Academy to give a locality worthy of the productions they sent. This was an important matter. The Exhibition of the Royal Academy ought to have vitality in order that the profession might be well represented. It should shew them as being artists as well as men of science. It behoved the profession to rouse themselves, that some steps might be taken, that more justice might be done to their art in the exhibition rooms of Trafalgar Square—that the public should hold them in more esteem—that the benefits of the funds, with which the Academy was endowed, should be distributed amongst architecture, painting and sculpture, with a greater consideration to the former than had hitherto been bestowed, and by that means the Academy would entitle itself more to the gratitude of the public. Another topic of great importance touched upon by the President was that of the French International Exhibition of 1867. He hoped the plan that had been proposed of forming a special committee of this Institute would be carried out soon; the duties of which committee would be to receive designs intended for exhibition, to eliminate those which were worthy of our School, and forward them to Paris. On the last occasion there was a similar committee established, consisting of his friend Mr. Gilbert Scott, one or two others, and himself; and he recollected anterior to that a similar process was followed, and they had great gratification in sending a collection of drawings well worthy of the profession. Every drawing could not of course be sent. Some men had high ambition and little talent, and if they were mistaken, it was a great point that the Committee should not be mistaken. It was very important that they should send proper exponents of what English Architects could do. He hoped this Committee would be established soon, and that our architects would be prepared to enter into that great international contest, which they would have to sustain against the architects of the whole world. He trusted the English Architects would show themselves, as before, worthy of the position they ought to take in the face of the whole universe. The learned Professor concluded by moving a cordial vote of thanks to the President for the able and instructive discourse with which he had favoured them that evening.

Mr. GEORGE GODWIN, Fellow, begged leave to second the proposition, and would so in a dozen words—half of them being for the expression of his gratification and thanks to the President for his very catholic, eloquent and useful discourse, for which they must all feel exceedingly obliged,—the other half to express the satisfaction with which he saw public reporters again in that room. As a very old member of the Institute, he must congratulate his brother members on what he considered to be a step back from a mistaken policy towards that policy of publicity to which the Institute owed much of its position, and by means of which it was beginning most effectually to interest the public in the welfare of the art. He had no desire to say more, and he seconded most cordially the vote of thanks to the President.

PROFESSOR KERR, Fellow, begged to add the expression of his gratification at the address with which they had been favoured. What happened most forcibly to strike him individually, was the sound practical value of the hint that the architect and the engineer ought to be more drawn together. It might, perhaps, be a good plan for this Institute to enter into a sort of negotiation with the Institution of Civil Engineers, whereby each Society should admit a certain number of the members of the other as

Honorary Members or otherwise. They must bear in mind that architects were at present not eligible as members of the Institution of Civil Engineers, except as Associates; indeed, one of the most distinguished members of the Institute, who was at that moment a member of the Institution of Civil Engineers, was only an Associate; and of course it was not to be expected that members of this Institute generally, of such standing as that gentleman, or even considerably less, would submit themselves for election as Associates. He had, however, risen chiefly to express, on behalf of what might be called one particular class of the meeting, the great satisfaction with which he was sure every one of them had listened to the discourse of the President.

Mr. JOHN P. SEDDON, Hon. Sec., remarked that he had been much pleased to hear the view taken by the President, with regard to the desirableness of a closer connection between architects and engineers; and he thought it would be well that there should be a proper understanding as to whether engineers were admissible as members of the Institute of Architects, and if so, in what capacity, as he himself was acquainted with some Civil Engineers whose works would fully entitle them to such distinction.

Mr. JOHN W. PAPWORTH, Fellow, said that he had intended to offer on this evening no opinion upon the subjects mentioned in the President's address, but merely to express his appreciation of the logical character of that document. He felt, however, forced to take the immediate opportunity of requesting that there might not be any such precipitate attempt to carry out one of the views propounded by the President, or rather to go beyond it, as was indicated by the remarks made by Mr. Seddon. There seems to be a great inconvenience, to use no stronger term, in the difference between the regulations of the Institute of British Architects and the Institution of Civil Engineers; and until this can be abolished, it is useless to attempt any such fusion of membership in the two bodies as appears to be desired with the best intentions by Mr. Seddon. That gentleman must see there would be great absurdity in asking the Institute to elect, either as a Fellow or an Associate, any naval or military engineer or architect, whose merits, although recognized by everybody, would only place him in the rank of Associate at the Institution of Civil Engineers. There would be similar absurdity in asking that Institute to elect as a Fellow any member of the Institution of Civil Engineers so long as the members of the Institute were not received in the equivalent class of the Institution. Either of these absurdities would be perfectly contrary to the spirit of independence advocated in the address just delivered by the President, whose ideas upon the subject evidently demanded careful consideration, due not more to the position of their author than to their intrinsic importance. Perhaps much unpleasantness would be prevented and all personality hereafter would be obviated by declaring on the present occasion that if there were any proposal for the election into the Institute of any gentleman belonging to the classes mentioned, Mr. Papworth would think it desirable to follow the course which in two previous instances he had taken—namely, to recommend the candidate not to proceed to the ballot.

The question of the vote of thanks to the President having been put to the meeting by Professor DONALDSON, and carried by acclamation,

THE PRESIDENT rose and said, I can assure you, gentlemen, that it is a great honor, gratification, and relief to me that this address, which I felt was one touching matters of great importance and delicacy, should have been so well received. It is the result of my own honest thought, helped by no one, written within the solitude of my own room in the country, and sent to press without my having taken the opinion of any one upon it. There, gentlemen, it stands as I have read it to you. The way in which one or two points which I have thrown out, especially with regard to the Royal Academy and the French Exhibition, have been commented on by Professor Donaldson, has much gratified me. The

question as to the closer connection between ourselves and the engineers is a very broad one, and it would be unwise for us to commit ourselves at this moment to anything upon it. We must leave it to bombine in our heads and in those of our engineering friends for some time to come. But as to the more immediate question of the French Exhibition I am glad to state now what I could not do earlier in the meeting—that it has already come before the Council this evening: it was unanimously and cheerfully taken up in the sense in which you have regarded it, and it stands on the agenda for this day fortnight to bring it into a formal state.

IRONWORK: ITS LEGITIMATE USES AND PROPER TREATMENT.

By WILLIAM WHITE, F.S.A., Fellow.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, November 20th, 1865.

It is with some diffidence that I come before you to offer a few remarks upon the legitimate uses, and the proper treatment, of ironwork. My diffidence arises from no consciousness of unformed views upon the matter,—from no sense of doubt as to the position which I shall take,—from no lack of conviction as to the strength of my case,—but only from the knowledge that the subject has been already ably handled here,—that so many of those whom I address must have already formed their own judgment upon it, and in a more mature manner perhaps than myself.

But though with diffidence, and at the risk of informing you of a great deal that you are already well acquainted with, it will be with pleasure that I place before you some of the conclusions at which I have myself arrived; for it is a subject in which I have long taken an active interest, and which does not fail to interest, often in an unexpected degree, a class of men too frequently looked upon as amongst the most mechanical and plodding of their generation, and the least susceptible of art impressions.

I have once before treated of this subject, as it was represented to the English public in the great Industrial Exhibition of 1862. I then endeavoured to criticise, in a cursory sketch of the chief objects displayed, the especial failings and imperfections on the one hand, and the successes, so far as obtained, on the other, commonly attendant upon the treatment of metal work at the present day. It is in consequence of those criticisms that I have been now called upon to set forth, in a more general way, that which then attracted my attention only to a limited set of specimens. I know that many will have made up their own mind as to what is legitimate use, and what is proper treatment. It is too much to expect that every one here will have arrived in each instance at the same conclusion as myself, or would give consent to all that will be advanced. I do not think I would desire even that they should. I know too well the danger of thought running in a single groove, whether it is the thought of an individual, or of a body like this,—whose aim is the one single and persistent endeavour to arrive at the whole truth on the many questions, whether of science or of art, relating to architecture. I have reason to believe that several members of our fraternity are entirely opposed to the view which I take as regards the use and the treatment of ironwork in some respects. But in this, as in other matters, opposition may serve to call forth latent truth, which would continue dormant but for the effort of thought necessary to meet the objections raised. Some such objections I shall rejoice in the opportunity of bringing before you.

No one who has striven to obtain in his own designs a fairly artistic treatment in the manipulation of this material, can have failed to find at times the exceeding difficulty of getting his intentions thoroughly or even correctly understood by the workman. Much less has he been able to get his ideas satisfactorily carried out, without much personal application to the details of the work itself as it comes from beneath the workman's hammer. Perhaps too, at times, he has felt the difficulty of accommodating the treatment of the design itself to the capacities of this metal for representing it, or to the proper and fitting mode of dealing with a material so ductile and yet so stern and resisting and unrelenting in its character.

The first question which suggests itself is as to the fitness of iron for *all* purposes. This by some is made the stand-point for argument upon its merits or capabilities. I maintain that iron ought to be

used only for its *proper* purposes. "This is begging the question," say they. "*Proper* purposes are those for which it can fairly compete with brick, or stone, or other ordinary building material. There is no limit to its fitness or capabilities; but architects who have not learned its true artistic treatment for general building purposes will, of course, decry its use rather than proclaim their own incompetence to deal with it. They persist in the use of the old materials, merely because they will follow none but the ancient forms, and are determined to exhibit them still just as they formerly existed, but under entirely different requirements from those which now govern our art. But if it be admitted that if iron may be used for columns and girders, no legitimate reason can be alleged against the wholesale adoption of it in everything where it can be successfully applied. It is only because proper attention has not been given to the material; but the time will come for its universal use in ordinary houses, in walls and windows, roofs and floors, and for every purpose in fact, whether of construction or of ornamentation, in which brick, or stone, or wood hitherto have been, but no longer will be, the generally recognised materials." And we are further told, by way of confirmation, that we are fallen upon degenerate days; that art declined to zero at the end of the last century; that now indeed we have nothing to fall back upon; that in truth the last quivering of the pulse is still; art has utterly failed; its life is fled; "sculpture and painting have ceased to have any marked influence upon mankind." And why? It is, so far as I can understand what is urged, because the age of other materials has passed away, and the age of iron has set in. The remembrance of the past will be, and must be, crushed out of us, if we would rise to higher things than mere antiquated imitations of old types. We must throw ourselves heart and soul into the new state of civilisation, we must work out a new style, and set up our standard in the indomitable stronghold of an iron-architecture. For iron must be as capable of artistic treatment as any other material. It is only ignorance of its adaptability that stands in the way of its universal use.

Such are the ideas of some amongst us who have taken it up as their specialty. I say, however, that this mode of dealing with it really is begging the question. Granting, as all must do, its capability of artistic treatment in its proper place, what has this, I would ask, to do with its universal adoption, or its universal fitness for every species of architectural use? So far as I am concerned it may predominate in Utopia, but until we reach that golden shore we must be content to limit our views as to the use of iron for every purpose. So long as it helps us on our road we will take it by the hand; but when it becomes a drag we may fairly leave it to others to bring after us. Iron must be only a servant to architecture, not its lord; and if ever it should usurp the power of a despotic tyrant, woe to the art which will be enslaved by it.

Some, indeed, have taken a very advanced step. They maintain that under the use of iron "purity of outline, with almost total absence of ornament, might gradually be made to pervade everything from our buildings to our tea spoons." Let this be said as regards any fitting material, and it is perfectly true. But it is singular and noteworthy, that as regards iron it is simply and absolutely false. The very compactness and density of its substance in proportion to its strength render it unfitting as a medium for the expression of bulk, and so of proportion, to a very large extent; and its hardness and harshness of texture render it still more unfitting for such articles of household use as would indicate such a refinement of civilisation or such a development of art. This in itself is sufficient to shew the fallacy of the proposition. But more than this; so long as brick, and stone and wood exist, that is to say, so long as the world lasts, these, and these alone, will be the staple material, the true and universal media for the expression of art in forms essentially and strictly architectural. This I say fearlessly is a truth almost too simple to be argued upon, although I shall give, in passing, good reason for my assertion. Do I therefore ignore the use of iron, and say that it is incapable of artistic treatment? By no means. In its degree, and in its proper fashion, it is capable of high artistic treatment as other

material is, though not to the same extent. And, as I have just said, for the expression of bulk, upon which the proportion of all true architecture,—irrespectively, I mean, of any particular phase of it,—to so great an extent and so materially depends, it is utterly inefficient. For the highest class of art, again, namely, for the representation of the human form, and for other followings of nature, it can never compete with stone or marble, with silver or gold, or even with bronze. In the higher forms of art the hardest of materials oftentimes are chosen, in spite of their hardness, either for their intrinsic value, or for their capability of manipulation, or for their fitness to exhibit in a durable and striking manner the spirit and the precision of the artist's hand, and the power of his conception. In every one of these respects iron is far behind all the other materials which I have named. I am at a loss to discover, for such purposes, its single redeeming quality. Its final destination I can foresee. In after ages, when the granite or the gold, the marble or the bronze, shall be treasured up, valuable works of art, the material which will the most quickly and the most surely find its way to the furnace happily will be—the old iron. Its very incapability of being cut or tooled into shape, after casting or moulding, and its inevitable oxidization when old, will effectually prevent its being commonly used for any such high purposes. It is in such works as these that, most of all, the skill and the feeling of the workman himself must be impressed upon the otherwise inanimate material. And hence I say it is not a material of the highest class, in its relation to architecture as an art.

In constructional or mechanical branches of architecture, however, iron henceforth exists as a subsidiary which cannot be dispensed with—which we would not dispense with if we could. In extensive works, to be built with vast accommodation and at moderate cost, or within a short limited space of time; in engineering works, and such as are more strictly utilitarian or constructional, rather than architectural, properly so called, iron will hold its just and undisputed sway. And no one will grudge it its high dignity. But let it not intrude itself as an equal into the society of its betters, except in the garb which best befits its station, after long and painful submission to the hammer and anvil of the artist-smith. For it is true in this, as in all art, that it is not in the utilitarianism of a thing that its beauty consists, as some perversely and perseveringly maintain. Utilitarianism may be one element of beauty amongst many, more important ones; for a thing must be fitting for its intended use; it must present no contradiction to the law of fitness. But its beauty lives in a far higher element; for the maximum of beauty, in kind no less than in degree, is found mostly with the minimum of utilitarianism; and even in things utilitarian, it is something superadded to, or growing out of, the utilitarian basis, which imparts that sense of pleasure which beauty gives; and this something is not obtainable, excepting, perhaps, in a low and a limited degree by any mechanical process; and the construction of iron on a large scale is essentially mechanical, as will appear presently.

The main argument for iron, so far as I can make out, is its thorough utilitarianism and its general adaptability to such extensive works as I have referred to. It has, however, been admitted that, at present, it is useless as compared with brick and mortar for walls of warehouses for the stowage of combustible material; and in regard to durability, it has got to stand the test even of a century. It does not promise well for the prospects of iron that no effectual protection has been found for it, of a permanent description; whether for its external surfaces, or for those portions of inner surface which are subject to the friction and wear of bolts and bands. But when these objections, amongst others, have been obviated by future invention, it is difficult to conceive of iron as of a material strictly ARCHITECTURAL in the sense in which brick and stone are so. Its very nature forbids it. If used for common building purposes, the very necessity for its exact reproduction and vast reduplication in large and prevailing forms, its uncompromising resistance to any modification of outline, or of treatment in detail, puts it almost beyond the reach of architectural art. I will not even bring against it the difficulty

of consistently ornamenting an iron construction, lest I should be misunderstood or misinterpreted;—seeing that there may be high architectural merit nearly or entirely without ornament, popularly so called. But this I will say: it is not even a question of equal availability with brick and stone for building purposes, but a question of equal availability IN COMBINATION WITH an equal capacity for giving expression to form.

Again; architecture is a fine art. It is not pretended by the advocates for iron that anything but cast or rolled work can be used on a large scale. Forged work would be useless in the main structure. It could be introduced only in the subsidiary ornamental details. Expense alone would forbid it, were it not already excluded by the necessities of the material itself. And the stern multiplying process of machinery never can be applied to art as a fine art. There may be great art as there must be great science called into play in the process, but still it cannot class as a fine art. Its class must ever remain that of a lower order, more nearly analogous with such works, for instance, as those of photography and lithography in connection with pictorial art. There is great room for the exercise of the power of the artist who produces the negative or the block; but the print from either of them is not and cannot be equal to the enduring touch of the artist's own hand upon the panel or the paper. The amount of the individual mind exhibited in the means employed may be of the highest order, but its full power will be over-balanced by the presence of a mechanical result.

For the main constructional portions of domestic or ecclesiastical buildings or of public civic buildings, which are to be monuments of art, there need be no fear of the good sense or the good taste of the country being so changed as to adopt the universal use of iron. And the minimum of bulk already referred to, which iron presents, at once places it beyond the pale for church architecture especially. It may be used with great advantage for temporary churches, until fabrics more substantial in appearance as well as in reality can be raised in their place. Its very facility for removal from its old site, when its use has been superseded by something better, and for reconstruction on a new site where a fresh population has started up too quickly for its wants to be otherwise supplied, will often render it not only available but desirable for such temporary purposes. For places of worship of non-conformist denominations it is not for me as a churchman to dispute its applicability, for I do not know the exact limit or the extent of their requirements. But I know that generally they altogether ignore in their buildings any symbolical connection of things temporal with things spiritual, of outward expression with hidden meaning, and any embodiment in the material fabric of that which alone is true and enduring. And at all events they have no such enduring tradition to perpetuate, as the church maintains, whether of faith or practice, or even of mere outward expression of dogmatic teaching, descending down from generations past to generations yet to come. But it may be that iron not inaptly represents certain modern developments of belief, or modes of modern thought; it may possibly exhibit to perfection the power as well as the popularity of oratory, or the passing, or even more permanent emotions which it calls forth; but it can never display the stability or the repose which is formed beneath the shadow of an old and enduring institution such as the church, with all her vicissitudes and trials, has been and will continue to be.

Iron may exhibit lightness, and a certain amount of elegance, but it never can impress us as representing the more sterling characteristics which bulkier materials from their very nature are capable of picturing to our imagination. Nor do I anticipate the time when the allusions embodied in the fine old hymn "Angulare Fundamentum," still in constant use amongst us, shall become obsolete, or when that composition will be superseded by some effusion which shall bring before us a corner column of resounding metal.

Still I can readily believe that to him who ignores or denies all connection of poetry with

architecture and all influence of the one upon the other,—out of whom what little poetry he may once have had has been driven by the dry and practical business of city life, iron might become a staple material. And if we accept the saying of Coleridge, that poetry is antithetical not to prose but to science, we can understand how easily a man may suffer from increasing contact with the every day world; how his ideas may become cramped and his imagination dwarfed; how his perception of the real will embrace only the busy street, or the still more busy office, and at length how sceptical he may become of the existence of anything higher and purer than that which meets his outward eye. But is this an end to be desired by those that aim at raising architecture from the dust to what it once was? If I thought so, art to me would lose its charm. If it were so indeed, many of us would no longer hesitate to embrace the more purely scientific and constructional branch of it, irrespectively of other, and as many deem, higher considerations, even if it involved a more complete carrying out of an iron system.

Before passing on to the second branch of my subject I would observe that this view of the legitimate use of iron opens up the whole field of a discussion, which seems likely to command attention for some time to come,—the relation of architecture to civil engineering, and of architects to civil engineers. In all probability the next few years will bring this question more prominently forward, and if others feel as strongly as myself upon it parties may run high. I have no wish to promote that strife. At the same time I should but do you as well as myself injustice if I did not declare plainly and unequivocally my conviction and the side which I must take. From what I have already said you will not be surprised at my inclination to regard the two branches as more thoroughly distinct than it is now becoming the custom for the advanced school to consider them. But there is one point which I would commend to the especial notice of our late most esteemed and worthy President. He well knows that there is an established term applied to great and enduring works of architecture. They are popularly called, and deservedly so, “Monuments of Art;” monuments wherein Art and its memories continue to live embodied, ages after the spirit which called them into being has passed away. I look forward to the day when another term, not instead of this, but side by side with it, shall have been equally and as substantially recognised, namely, “Monuments of Science.” Their birth into the world has been already celebrated; and their names are even now too many to enumerate. You will have anticipated my intention of classing amongst the foremost of “Monuments of Science” of the present age, such works as the Crystal Palace, the sheds of various railway stations, and the bridges or viaducts of Crumlin and Saltash, Menai and Hungerford; and it is advisedly that I mention sheds of stations, and not the station-houses themselves. But are such amongst the monuments of art *quoad* art, and to be classed in the same architectural category with the Palace at Westminster, the Town Hall at Liverpool, or the Manchester Assize Court? If any think so, I must range myself amongst the opposition, I cannot side with them.

Possibly there may be something to say on the other side of the question; and it is very certain that the two arts of engineering and architecture do, to a very great extent, so run together and intertwine that it is difficult, if not impossible, exactly to define their point of contact or of separation. But it is equally certain that the real elements of the two are entirely distinct, the one consisting in the science and art of construction,—the other in the science and art of composition and design, properly so called. To say, however, that the civil engineer ought to, or can, or does so ignore composition and design as to disregard the effect of his work upon the eye when finished would be as gross a calumny upon his branch of work as it would be upon architecture to say that an architect as such, need know, or does know, nothing of the principles or practice of construction; perhaps it would be well if each knew a little more of the other's branch than is sometimes evident at the present day. Nevertheless,

I feel sure that I never can bring myself to acknowledge that the two branches ought to be, or can be to any great extent combined in the same person, much less body of persons, excepting in a manner as well as in a degree which shall be highly detrimental to both. In practice they may be occasionally combined, but in theory they are essentially distinct. Here it is that I take my stand. I do not deny the advantages that might be gained by each member of either branch taking a degree, it may be, in the other's specialty, supposing there to be schools of art in each department, as there ought to be, and some day will be. But shall this therefore be the signal for the rise of petty jealousies and party strife between the two? Heaven forbid. Shall it not rather be the ground-work of more close combination and intercourse, whereby each may stir up and instruct the other, so to say, in the special branches in which they may severally be deficient? Let us look at an analogous art. Physic and surgery are said by some to be so interwoven in their natures that each practitioner may well combine, and ought to combine the two. It is true that they are interwoven to such an extent that every one who practices in the one branch, must of necessity know more or less of the other. But what do we find? Not only are the colleges for the two distinct, but the practice of all the most eminent of the day naturally falls into the one especial line for which they have a predilection or talent, and to which they have in consequence directed their studies, although it is true a considerable number professedly practise in both lines. Yet the broad distinction remains, broadly and distinctly defined, and ever will remain, between the surgeon and the physician. The one devotes himself especially to the general construction of the human frame, with its various forces and movements, the other to the general physique of that same frame as bearing more directly upon the circulation, and the assimilation of those substances which maintain life, and upon which health mainly depends. Time forbids me to pursue this comparison, else it would be interesting to observe, as illustrating the same truth, the different ramifications in detail in either instance, to which the especial attention of the individual is devoted, even down to the more minute and inferior parts of our organisation; exactly as in architecture the arts of painting and sculpture, and all the plastique arts, are severally followed by their respective devotees; as also in like manner, in civil engineering, the various branches are separately practised, although all these, in either case, are properly included in the general pursuit of the profession. We cannot now follow this further, but we may rest assured that the whole analogy holds good sufficiently for the purpose of showing that the new theory of a fusion of the two is unnatural and impossible, although a fraternal relation might be established with mutual advantage to both.

Having now vindicated the cause of iron, as well in its legitimate use as from its growing abuse, I must endeavour to sum up the chief of the different modes of treatment, and the several processes, which can or cannot be justified by a strict observance of the distinctive qualities of the material. It is difficult to lay down dogmatic and unerring rules as to what is right or wrong in principle; or always to say whether such rules are infringed or not in a given instance. It may, however, be stated generally, that proper treatment for wrought iron (Figs. 1 to 4) is exemplified in that which best exhibits the power of the workman's hand in the forging of it; and it is in design and fashion such as to preclude the probability, if not the possibility, of its having been cast or impressed,—whether by its delicacy of form, or its vigour of finish. Even in works of massiveness or strength some evidence will appear of the yet more overpowering force which has bent the strong metal to its will, whether it be by hand-drawing or tapering, or by some little playful conceit which the workman indulges in, thus stamping it as his own.

Cast work, on the contrary, must be more soft and superficial in its treatment; it must be such as to bear strict evidence of its impressment; it must appear in forms such as to be capable of, and well fitted for, repetition; such, in fact, as could scarcely be wrought even by great skill or by indefatigable labour; such as to exhibit chiefly surface work; such as to avoid all appearance of

scroll or curl or tortuous bend, or other little refinements and dexterities which can be displayed to perfection only by the hand of the individual workman. The distinctive difference, indeed, between the true art-treatment of wrought and cast metal is, that the former must display its ductility and vigour; the latter its impressibility and passiveness. It is from the denial or neglect of these qualities that failure commonly commences in either case. But there is a third description of work which ought not to be passed over. It is the treatment of that which is called malleable iron, so called not because it is hammered out, but because after it has been cast or pressed into a die it is capable of receiving without fracture a certain amount of hammer labour. Not that it does receive this, excepting perhaps in minute proportions, and in rare instances; but it is a name which appears in published price lists as a sort of sign-post to misguide an uninitiated and unsuspecting public to the idea that it is not only malleable, but actually worked by the hammer. And if only casting or pressing be used in its production, wherein is it better than common cast or pressed metal? Its superiority consists, say its advocates, in its texture and strength, which are allowed to be nearly equal to those of wrought iron. And I am bound to acknowledge that here, even in iron, is a material capable to some extent of high art treatment, if only it is used for such. But let it not be degraded to the common level of other moulded metal. Let it be designed suitably to impressed work; let it be worked up dexterously and vigorously into something that shall be worthy of its use. Let not the forms be followed of a quasi-forged and drawn-out construction in its manipulation, but let it be cast and worked to the highest pitch of smithy skill; let its treatment tell the true tale of its high artistic development. Then call it malleable iron if you will,—but till then let it not be ashamed of its proper name. The term “annealed cast iron” would much more fitly express its known nature and qualities. But let its treatment justify its superiority, without having recourse to an unworthy subterfuge, almost as base as that of marbling a plaster cast to give it the dignity and the character of a genuine and valuable work of art.

Having now briefly outlined the several kinds of iron, and their respective treatment, the all-important question presents itself as to the means available, both in regard of the use of machinery and of the position and province of the workman employed upon it. In considering this branch of our subject we must bear in mind the truth that in forged work there is genuine art to be displayed. There is room for delicacy of expression, and for the exhibition of the forger's power, which is not possible in a mechanical process, and which, indeed, is the very element distinguishing art from mere mechanism. It is equally true, however, that great skill, together with great knowledge and experience, is required in the fitting of castings, or of machine cut details; and, when well done, skill is evidenced in the absence of imperfection and irregularity rather than in the presence of any element of pleasure to be derived from display of the workman's individuality. Whereas in such forged work as comes properly under this denomination, it is the reverse. It is not the absence of imperfection, or of irregularity, which pleases the eye, but the presence of a living power which has made itself felt upon the otherwise inanimate metal, bending it to its will, and giving evidence of its reality in spite, perhaps, of great imperfections, or of still greater irregularities.

Again, in a proper treatment of forged work, and in order to obtain the desired effect, great regard must be paid not only to the implements used but to the mode of using them. One prevalent failing in such modern work is that it is so intensely tame and shoppy in its finish. The cold chisel, the scissors, the file, are made to supersede the hammer and the tongs. The indiscriminate use of the file, indeed, has given rise to a false taste in metal work very much akin to that of scraping of the stonework of the noble minster fonts of Lincoln and Winchester. Let me, however, not be misunderstood. It is not that I object to the use of the file; but as I have upon another occasion observed, so I would now again take the opportunity of repeating—“the file must be used only as a means to an end, instead of

being, as is too commonly the case, the end to which all metal surfaces must be brought before they will pass muster with a misguided public. The file may be, nay, must be used for fitting and jointing, and the perforation of plates and other fine work such as the hammer could not touch; but the use of the file for finished surfaces is one of the first things that has to be abandoned before the forger can assert his rightful claim to our regard. Such treatment of surface is of the highest consideration in all art works, whether in wood, stone, or metal. In soft fabrics it is imparted by texture. In hard wares it is to a great extent given by implement and manipulation. A high polish presents one kind of beauty, and a rippled or broken surface another. A merely crude and neglected surface does not satisfy the eye. Labour of some sort must be bestowed; but only in a proportion to the pretensions of the work in other respects. But carving in stone or wood ought commonly to show the marks of the chisel or tool, and if these are scraped or filed, or sand-papered away, the play of light upon the surface is dissipated, its character is impaired, and its surface measure, so to speak, over which the eye has a pleasure in travelling, is actually diminished in effect. So, too, forged work ought to show the hammer marks, and wherefore should the roughness of the fire marks be filed down, when, by cold hammering, its surface can be greatly hardened and its tone deepened, its play of light increased, and a polish of a totally different but far superior sort imparted,—a polish not of mechanical labour, but of handiwork? And wherefore destroy the evidences of hard and well earned labour for what might be effected by the merest apprentice or a human machine?"

But, say the great wholesale iron-workers, in order to carry out this view of art in iron-work, you would have all the workmen to be artists, whereas under our present system we find one artist sufficient to afford employment for a large number of ordinary workmen. I would have no such thing. I only say, do not bestow the term "high art" upon work produced by machinery, and fitted by a mechanist. In order to have high art as distinct from mechanism the hand of the individual must so far predominate as to throw into insignificance the mechanical process by which any of the subsidiary forms may have been produced. This evidence of the hand of the forger in the execution of his work being needful, as the hand of the sculptor is in his, opens up a large field of enquiry with which we are at the present moment scarcely concerned, further than to call attention once more to the importance, which our present President has so often and so ably urged in other places, of promoting, by all the means which we can command, the education and the recognition of a class which has till within these few years almost entirely disappeared from the community—the class of artist workmen.

The mechanic, as commonly he is in nature, no less than in name, has, in taking the place, altogether usurped the province, of the artist-workman. There is room for both; there is need of both; but at present we are reduced almost to the one. The question to be considered is the relative position and the distinctive employment of the two distinct classes.

I have found, in the great iron districts of the North, a mistaken idea prevails that there is no real difference, and ought to be none, between hand-work and machinery as regards effect when finished. It is a mere mercantile calculation as to whether machinery or hand labour shall be employed in the execution of a given work, and as to how far it will pay to produce fresh machinery, dies, or gauges to reduce the work to its requisite state for finishing and fitting, leaving as little as possible for hand labour in the completion of it. And the amount of art displayed is measured, so to say, by the ingenuity of the machinery, and by the success which the article has in pleasing the public and effecting a sale. It is considered unworthy of the age to put to hand-labour that which machinery is capable of executing,—and this as a matter not merely of economy, but of art. Articles so produced are classed with the fine arts as nearly on a par with stained glass and sculpture; and certainly with forged iron. And no doubt there is great art in the invention of the requisite machinery for the facture of such

iron-work,—machinery which performs all sorts of operations,—cutting, piercing, rolling, stamping, and pressing,—machinery of such power, and adjusted withal to such accuracy, as to crack a nut, and yet not crush the kernel, with a force of twenty tons. And it is not without some show of reason that the impression arises of the day of hand-labour being past beyond recall. Am I therefore finding fault with this state of things? By no means. On the one hand I know the day of hand-labour is not past; and on the other I am too thoroughly convinced of the truth of the dicta of the political economist not to see that a vast population must have vast supplies at a reasonable cost; that machinery is an untold blessing to poor as well as to rich; although the change must bear heavily at first upon those whom, for the time, it deprives of labour.

There are people, however, even now who deprecate the use of machinery, not for its injury to art, though partly on this account, so much as for its drudgery, and for its degrading influence upon the men who have to spend their lives in working it. It is, say they, the weary round of one unchanging operation which tends to limit the mechanist's mental growth and to make him the creature of one idea. Now it is from the best authority that I speak when I affirm that the case is really quite the contrary. There is no drudgery so great, no degradation so low, as in those branches of manufacture requiring large reproductions of one form, or vast repetition of one process, to which as yet machinery has not been extended. In physical health, in moral condition, in general intelligence, the whole of the community is in a lower position. Machinery is not only a necessity of the age we live in, but also one of its greatest blessings. The converting of a man into a human machine, which has been tauntingly attributed to machinery, is more truly and more universally attributable to the lack of it. Then, says another, if machinery is such a civilising invention, how in the world can you justify your assertion that the day of hand labour is not past, or how depreciate the value of machinery to your working smith? Simply, I say, because HE is an artist. His true work lies not in a pattern to be reproduced a thousand times, but rather in the impression of his own individuality on every single form that he takes in hand. Here is the touchstone of the working artist. The magnet never wavers from this point, from whatever direction it is applied.

And in so far as we are content with the lowlier forms of beauty, let us use machinery by all means. But if we would aspire to the loftier, we must have the force of arm and the power of mind necessary for their production. It is very easy for others again to say, then let us adopt simpler forms and do without machinery; but neither will this do; as I have just said, we want wares for the million: and, in manufacturing for the million, we do not want the highest class of art, or a cheap and nasty reproduction of, or substitute for, that which ought to be costly, and must be so if it is to have the effect first designed for it. We do not want the poorest description of that which aspires to be of the highest order; but rather we want the best of its kind in everything, even in that which is of the lowest order of manufacture. For example; if iron or pewter spoons are wanted for our cottages, or for our kitchens, we do not require them to aim at the more ornate patterns employed in spoons of silver, or of gold, even supposing the pattern to be, by the aid of machinery, as easily manufactured as the other. We would have them to appear useful rather than ornamental, to avoid ugliness rather than to ape art. Otherwise true taste will be offended instead of gratified, and a love of finery instead of refinement will be the inevitable result. Simplicity is wedded for ever to utility; that which is less necessary may reasonably be more ornamental. The less necessary member, indeed, is the proper receptacle for ornament. We want a handle for holding. It must not bristle with ornament so as to cut our fingers. But let the plate which merely covers the joining of the handle be as ornamental as you please, and the severest critic cannot complain.

But with regard to the process to be employed, it is urged, again and again, that surely it must be not only legitimate but right on every account to use the most available means at our disposal to obtain the result required; that if we require work of a certain form, no matter to us whether the material is

cast or wrought, cut or stamped, or whether it is laboriously beaten out by the sweat of the brow; and that it is hard if a man may not execute a given work in his own way, and derive all the benefit he deserves from his intelligence in executing it. The fallacy lurking beneath this specious argument is two-fold; and withal there is in what is urged enough appearance of truth to mislead, if unopposed and unexplained. One part of the fallacy lies in the implied supposition that the design itself is, or can be, such as to admit of treatment equally successful, equally good, whether executed in cast, in rolled, or in wrought metal. As matter of fact or of use, it may be no matter to us personally,—in so far as another man's actions may be beyond our control or our regard; but in the interests of art it does matter to us if its simplest dictates are to be set aside for the untruth which this involves. The other part of the fallacy consists in the idea that, even with the best intentions and endeavours, as good a result really can be obtained in any art-work whether the right or the wrong method be pursued. This, unhappily, is a fallacy which has a great hold on the popular mind. It is, however, so manifest as to be scarcely worth refuting. And we may take it as a maxim that—in spite of what we are told as to the relative prices of such wares in the modern illustrated catalogues—it is next to impossible, if not quite so, for any design having pretensions to art as well as to construction to be fairly capable of a rendering in that manner by an alternative process, or in an alternative manner. But I may add one illustration, amongst many that might be brought forward, of a similar principle in another branch of art. One can readily understand the fabrication of woven tapestry of various different materials, whether of silk, worsted, or cotton, to the same design, at relative prices. But what would or could be said of the value of a hanging or an altar cloth with a graduated price according to whether it has been executed in a loom, or by a sewing machine, or by hand? It would be absurd. If the design is such as to be readily and effectively executed by machinery, and is capable of reproduction, and would bear it, why should we go to the needless labour of plying the needle for every stitch that covers the fabric? But if it be such as to display delicacy and particularity of manipulation, surely it would be equal folly to go the cost of machinery, which would deprive the work of its character, and actually make it more costly than if every stitch were worked by hand; even then to fail of the especial effect aimed at. Yet woven materials have their value. But that value is not, and never can be, compared with that of embroidery as upon the same level. A gorgeous woven pattern may be vastly superior in workmanship, as in material, to a bad piece of embroidery of poor material. But, *cæteris paribus*, there can be no comparison between woven work and true embroidery. The one can be produced at so much a yard; the other must be wrought by capable hands in such a manner as to inspire us with a sense of the loving care which has been employed upon it.

We must now pass on to a few details of the processes which may or may not be truthfully and properly employed in the execution of ironwork. It would be undignified and uncourteous, as it would be superfluous, to say anything here as to the general merits or rather demerits of shams, or of their degrading influence upon high art, before a body of men who more than any other in the world have already and for ever repudiated them. But it is needful for me to call attention to the insidious way in which shams do creep into the manipulation of modern metal work; and in order to make my position clear let me give an instance, not as instructing you, but only as illustrating my meaning. All are acquainted with the universal mode of twisting a square bar of iron. This process is said to increase its stiffness or rigidity, but at the same time it enriches its surface. It is essentially a process of the forge. Not only is a certain degree of heat for the operation requisite, but a firm hand and a ready eye in the operator—else the twist will be anything but ornamental. And what do we find? This twist, so telling in its proper place, and in a sparing degree, is actually reproduced in cast iron by the foot, one may almost say by the mile; and this even by some who aim at leading in the van of high metallic art. I say the sooner they go to the rear the better, the better for themselves and the better for us, and the better for art. One mode of forming a twist by machinery there certainly is, which may be

legitimate for work merely decorative, not constructive or quasi-constructive. This mode is properly applicable to brass only, and not to iron. It is the forcing of a tube through a spiral die, which produces the twist clean, sharp and regular. But when these tubes are used as apparent supports to arches or to entablatures, it may fairly be questioned how far they represent legitimate treatment, even though they form but the casing to cast iron columns which do the real work for them. Again, I do not see how a constructive arch of iron, whether wrought or cast, can be called defensible as an architectural feature. An arch, as such, implies a constructive process, such as of brick or stone in its erection. Or once again; what can be more absurd than the reproduction in cast iron of the distinctive features of caps and bases, cornices and plinths, moulded and cut after the fashion universally suggested by the necessities of a stone construction. Yet I have been gravely told that such narrow views as mine would set aside one great principle of mediæval metallurgy, namely, its comprehensiveness, which found employment for every description of manipulative detail, such detail often following in its ornamental features the constructive forms suggested by other materials. In no way does my objection militate against this principle. For suppose the artist to invent or to select from some such other extraneous source the form best suited to his purpose, the smith will not reproduce it as stone, or as brick, or as other material, but will produce only some general idea of the form, rather than a leading and constructive characteristic of that which he followed; much less will he aim at a direct imitation or reproduction of it, and no matter from whence a form comes, so that that form is good and suited to its purpose. The cast column, even, might be used and then covered with plates of finer material, so that these be not made as independent cases or cloaks to give an air of construction to that which is only decorative, and yet withal very legitimately is decorative. Nothing, however, can approach to the deliberate perpetration of a cast iron cresting, such as that of which I give an illustration. In this we have not only pretentious cusps and braces of a wrought construction, but even the apparent rivets with which it is pretended they are fastened together. I would not add a word upon the unpardonable parodies uttered in the shape of would-be hinge bands; but that every time a protest or a warning is uttered it may chance to fall upon some ear which it has not yet reached and which may yet profit by it. And unhappily this is a delusion still practised upon those who know no better, through the catalogues of manufacturers of such wares,—the delusion that a cast iron hinge-band adds one whit to the architectural effect of a door, and does not rather destroy all that might otherwise be good about it. The "small cost" is used to justify an expenditure which would be much better saved altogether. The small cost would be much better expended on sending them again to the furnace; for such work becomes a species of trickery which is quite alien to the true spirit of art.

The great aim of art is not directly to imitate but to image. Not to deceive the eye of an intelligent being, but to present or re-present to his imagination an idea which is worth reproducing or perpetuating. If the means used are opposed to or inadequate to the end, the imagination takes offence at the deserved failure. And if such poor artifices are used, the taste becomes depraved; and I believe it to be quite possible for the artist to get into a way of living upon fallacies, as the opium eater upon his drug, till his art-life becomes a morbid state of existence, rather than an existence of energetic enjoyment of its realities. These amongst many prevailing instances of a state of sham pervade our modern iron work, and hinder its rising so rapidly as it might to the position in art which it ought to occupy. And, although, as I said, I do not find fault with the state of things as regards machinery and its necessary application to all useful purposes of daily life, yet I do object most seriously, most strongly, to the system so largely adopted of imitating forged work on a large scale by the bending, gauging, cutting, screwing together by hands which move as mechanically as machinery does, work which is disappointing and insulting, from its tame and lifeless character, whilst it promises and professes at first sight to lay claim to our respect as a genuine work of art.

And such, alas, is the practice of all or nearly all of the monopolists of so called mediæval metal

work. The intelligent working artist takes in hand a corona or a grille, which shall impress people with the idea that it is forged by the hand of the expert smith. The work is completed. The popular voice, expressed with all sincerity, "how pretty, how neat, how exquisitely finished," prepares us for the evidence of its having been mechanically cut, bit by bit, from plate or bar, as the case may be, pressed into form by stamp or die, folded, bent, crumpled, filed up and fitted, and finally put together with nuts and screws, by a process of mental machine work, such as might do credit to the professed manufacturer of cast and machine-made wares. But the living working artist, where is he? He is degraded from his post of honour. He is become again a mere mechanist, just when he began to flatter himself that he was rising to the rank of artist in his profession. Let us leave him there,—for he can scarcely come forth again to higher aspirations. Let us draw the curtain over this sad, this humiliating picture.

The mode of manipulation in old work even till the early part of the present century was very different. Look at the wrought gates of our country mansions, or even at the ironwork which still graces many a house not yet a century old in London. Look again at the fine mediæval hinge bands as an illustration of proper treatment adapted to the several parts. The ornamental bands were forged and finely wrought, and bent to proper shape, but the terminations sometimes were stamped and cut with tool and die made for the purpose. Both of these processes required equally the hand of the skilled workman to use them. The terminals sometimes were apparently first cast in a mould, and then worked up and fastened on in their respective positions; and they consisted only of such surface treatment as could be stamped. In none of their stamped work did they ever aim at tortuous bends, or other forms, such as properly could be carried out by forging alone. But there are some who, at the present day, would not scruple to reverse the process, to forge the terminations and to cast the scrolls, if we may judge of them by what they do and say in other ways.

One mode of manipulating an ornament in early work was by the cutting of the cold iron with a hardened tool and hammer (Fig. 7), in such a manner as to cause the portion cut to curl up and form a scroll. We all know not only the old picture illustrating this process, but also specimens of hinges ornamented evidently by it. It gives a sharpness and crispness of finish to the metal which could not be got by other means, and which is well worthy of our following. But regard must be paid to the quality of iron required for this process, as in fact for all good work. Much of the iron is very inferior for such purposes at the present day. Modern improvements in smelting have increased the hardness of the metal and expedited its manufacture at the expense of toughness and ductibility; and such iron is all but useless for the forging of fine work. It breaks away under the process of hammering or of bending, in the forging of it.

One of the most common forms in which cast iron comes before the multitude is in that of the straight bar enclosing the area of every ordinary dwelling house in this metropolis and other large towns; and the question naturally arises how far that form is justifiable. In answering this we must bear in mind that expense cannot be entirely set aside, however much we may desire it; and that the difference between wrought and cast for the purpose referred to would be perhaps some three hundred per cent. in favour of cast. Are we then reduced to the dire alternative either of doing a great wrong to art, by abandoning our principles, or of incurring an unjustifiable expense. I think not. Only if this cast iron pretends to be wrought, it is an egregious sham; for instance, if it presents the spicuous point or the leafy scroll which ought to be turned out, and properly can be turned out, from the forge, and the forge alone. What would be said by a brave warrior of old, could he now see, bristling on all sides of him, the common but contemptible device of a cast iron spear with a cast iron tassel drooping from its head, set side by side by the neck to line the footway; with mimic urns, it may be for the standard ends? We may well hope, however, that the day for this is past. One mode of obviating this objection to the upright bar is to have, instead of the bar at all, some impressed pattern of genuine cast iron design,

which in itself will be more artistic and more ornamental. We must, however, remember that the main, I may almost say the sole reason, why a long straight bar instead of an ornamental pattern to a London area is, in many cases, indispensable is as a mere matter of security. Anything which would afford easy foothold, as all or nearly all cast perforated patterns must do, would afford facilities for the ingress and egress of those whom area railings are chiefly designed to keep effectually out. But this seems no reason why the upright bar should be of the common round or square section of wrought form, rather than of a flattened, patterned, design (Figs. 5 and 6); nor why the top of the bar should not be cast in some such form as to show evidence of its impressment, instead of imitating that of a kindred branch of trade. We must, in such cases, meet the case fairly and upon its merits, and we shall find that so far from our art suffering degradation by making use of available means, it will be in reality exalted and ennobled; for then we shall have to contend with those only who are afraid, or ashamed, of the truth.

In conclusion I must be permitted to say that I fear I may have spoken more strongly on several points than some may approve; but not more strongly than I have felt. And, having had my say, I am equally ready to listen patiently to all that can be said, if there is anything to be said, on the other side. There is, perhaps, room for much discussion and for much difference of opinion. All present know the difficulty of coming to an agreement on theories of art chiefly, on account of art definitions. In my remarks this evening I have aimed at two things; the first, to make myself clearly understood; the second, to avoid fighting an imaginary foe. If the latter appears to you to have been my fault, I shall set down my failure as due to my failure in the former, and I hope that any disagreement on your part, from my conclusions, may be traced only to that common source of discord,—the difficulty of fully realising the aspects of art, no less than of events, from another's point of view.

MR. JOHN W. PAPWORTH, Fellow, would make one or two remarks in the hope that the paper might not appear to fall flatly upon the audience, as he was sure that this was not the case. He would not go into the great question therein treated, viz. the fusion of the two forms of art and science as presented in the professions of architecture and engineering; because his opinions on the subject had been so recently expressed in the room: but he would refer to one or two of the technical points more especially touched in the latter part of the address just delivered. On one point it seemed that the author of the paper had forgotten a great portion of the principle therein propounded; and something might be said to show that the practice of architects, for a very long period, had not been so absurd as to require the corrections, with which it was threatened, regarding the usual railing to an area in a street. The common railing, made of bars or rods confined at bottom in the curb, and at top by a flat rod, is really faulty only at the bottom: and, when the rods are round, this form of defence is the simplest, and therefore the cheapest, as well as the best, that can be devised for the special purpose; no person has a right to erect as a protection to his property anything which will cause unnecessary damage to any person coming honestly in contact with it; and the area railing of London is quite dangerous enough without being treated in such a manner as represented in the illustration exhibited by Mr. White. There each upright bar has the edges of its face engrailed or brought to faint cusps about five inches apart; and it would be more easy to fancy what Mr. White would think, than what he would say, if he were to slip and strike his own temple on one of these engrails. Mr. Papworth preferred the usual top rail to that shown in the same drawing. When a piece of half-inch cast iron, three inches wide, is employed for such a purpose in lengths that are not braced, the rail is properly laid on its bed as usual, and not on its edge as proposed by Mr. White; the reason of course being that the flat rail has much more power than the upright rail, to resist pressure from the street. Mr. Papworth confessed to having in early life attempted to depart from the usual system of such defences, but had found that spikes, especially the cusps of foliation, were intolerable in thoroughfares; in short, nothing in a railing that would catch a lady's dress was creditable to its designer.

Mr. Papworth thought that the spear-heads and tassels of the nineteenth century, although condemned by Mr. White, were quite as legitimate ornaments as the serpent's heads and halberts of the fourteenth century for a railing. Another subject which Mr. Papworth would touch, because the number of students at present in the room seemed to justify him in asking attention to it, consisted of the manner of rivetting adopted, almost exclusively, in the illustrations exhibited by Mr. White; instead of the bands or clips fastened either hot or cold (too often cold) which were formerly used, although not perhaps a very legitimate way of composing ironwork, and it seemed as if that gentleman had determined to ignore the principles which governed the smiths of the middle ages in the manufacture of their wrought ironwork, so far as regarded the junctions of various pieces. In the drawings shown by Mr. White there seemed to be many places where the rivets would have to be pinched into their place rather than have the heads properly formed by direct blows. Furthermore Mr. Papworth would call the attention of the meeting to a difference which existed in works of the early mediæval period and the present day from that of the best period of ironwork. In such best period the rivets were superseded by clips or bands, and the meeting would acknowledge in the several comparative sketches he now made on the board, the poverty and the richness in appearance of the two modes; in the same period, if a tendril joined a stem, its additional thickness was taken into account, and was even continued from the clip to the base of the stem; that was a law of nature observed by some of the smiths of the thirteenth century; but, as shown in the comparative sketches which he now made, was neglected in the twelfth and fourteenth centuries as much as in the present day.

MR. EDWIN NASH, Fellow, said that when he saw the announcement of this paper he wondered whether Mr. White was about to appear as a champion for the general application of iron to building purposes, but having great confidence in that gentleman's good sense he could not believe that it would be so, and he was sure it must have been observed that the paper just read was full of good sense from beginning to end. It was a great pleasure to him to have heard it, as it contained many high principles, much suggestive matter, and a good deal of didactic teaching very useful to all. He expected that a larger reference would have been made to good and bad works that have been executed, but time would not suffice; yet a good many instances might have been given as means of comparison which would have told greatly on the subject. He felt, however, that they were not going backward, but were going forward in the matter of ironwork, as was evidenced by the many excellent works that have been produced, and when we think of the rich screens of Litchfield and Hereford we need not fear. The malleable cast iron to which Mr. White had alluded he considered to be an objectionable material, and the hinge fronts, as they are called, which are so largely made of it, was an evidence of this by the great facility thus given for an absurd application of them to doors, on which they are no part of the hinge at all.

MR. JOHN P. SEDDON, Hon. Sec., remarked that the exposition in Mr. White's paper of the general principles which should govern the treatment of ironwork had been most admirable and exhaustive. The great difficulty which architects felt now-a-days was, however, to get their designs thoroughly carried out in point of detail,—in fact, to find that myth of which Mr. White had spoken—an artist workman! The truth was that such a creature at present did not exist, and how to get one seemed to be an insuperable difficulty, unless it were, perhaps, in the class of carvers. Carvers were a class of men who had been so trained as to be able to think a little for themselves; yet the difficulty of getting anything respectable in that branch was immense, and in metal work there was very little indeed that was decent. In the works of Mr. Skidmore, referred to by Mr. Nash, there was, doubtless, great excellence, but that was mainly owing to the fact that Mr. Skidmore was himself an artist, and had devoted much study and personal superintendence to the work, but that gentleman had recently stated that he had completely failed in obtaining or educating a single artist workman. It was not sufficient to supply good designs; in order to obtain a satisfactory result there should be such a treatment of the

work as to show that the hand which wielded the hammer had some feeling in it. The truth was that all modern ironwork was exceedingly slovenly done, the object being to get the largest amount of effect with the smallest amount of means. The most elaborate designs of architects in metal work were thus foiled in every point in the execution. That which in their design they had intended to be hammered was turned out in some other way. He, Mr. S. had lately experienced in the matter of carving the annoyance of not being able to get a single leaf thoroughly worked out—properly drawn so to speak, instead of doing this which seemed so simple, the sole object aimed at was to get the appearance of something like a leaf at a distance. The workmen would not take the trouble to make one good thing, in their hurry to produce a quantity of indifferent ones; and when in despair of either getting them to carry out well either his designs or their own, and had resorted to clear and simple old examples, to endeavour to get them to copy them as an experiment, yet even in their copies of these scarcely a line was truly drawn; still he thought that good must eventually result from such a training, and that it would be well if architects would turn their attention more to these matters, and insist upon accuracy in points of detail, and if they only succeeded so far as to lead to their getting a few leaves properly hammered out, it would be a considerable step towards correcting the present state of things.

MR. J. W. PAPWORTH had intended to have confined himself to the pleasure of proposing a vote of thanks to Mr. White for his paper; but the remarks just made by Mr. Seddon encouraged him to say a word or two more. First of all he should be glad to hear what Mr. White considered to be the best mode of preserving iron, both inside and outside of buildings; a great deal of trouble had been taken by members of the Institute with regard to stone, and he should be glad to have some information in the case of ironwork. A further object in rising again was to congratulate himself and the members generally on what Mr. Seddon had stated. For his (Mr. Papworth's) part he repudiated the idea of the art-workman as he was now pictured to us, and did not wish to hear much of him, even under better appearances. Mr. Papworth prided himself upon being able to make such a drawing as would show precisely what he intended or required, and he did not want the thoughts of the art-workman to be put in the place of his own. He did not wish the art-workman to say that the work would look better if made of a different pattern, or if worked in a different style, or if finished in a different way. He had suffered very much from such attempted *improvements* in a great deal of work: some at the height of sixty feet had to be re-worked, because it had been spoilt by the way in which the carver insisted upon finishing, for the carver was an art-workman who must think for himself, or must be allowed to consider himself ill-used; in such cases a more mechanical hand would be best. In the interest of the art-workman himself Mr. Papworth did not want to have to deal with a class of workmen who were required to find art upon the wages of labourers. He required either the assistance of an artist, properly remunerated as his colleague, who would not be ashamed to suppose that the views of the designer of the work must predominate; or else the service of a workman who would understand drawings so clear as those that Mr. Papworth took care to furnish, and would execute, as faithfully as he could, the details entrusted to him, without grumbling at his work being altered by the architect's own hand to put those touches which the architect required, and perhaps could not express even in words. The way in which a large class of workmanship had been destroyed within the last quarter of the century, through the idea of art-workmanship, was perfectly frightful; and if he were to be in practice twenty-five years hence he did not know at what cost he should have to put bad work in the price book. It was beginning to be acknowledged by builders themselves that scarcely a dozen firms in London equalled the best work of fifteen or twenty years ago. This arose, as he believed, to a great extent, because some practitioners required everything to be done out of hand; and consequently as their work had not the advantage of preparation and study, they were obliged to say that anything would do, if it were only done somehow. In some measure this resulted also from the existence of a number of so-called architects who were in the habit of making pretty little sketches, but who, not possessing the

power of enlarging them, nor of correcting the models in the clay, became the slaves of art-workmen who were in the habit of carrying them out. He begged to propose a vote of thanks to Mr. White for his paper, which he believed would do good; and which he had no doubt would be better appreciated when read at home with opportunity to reflect upon it, than at the moment of delivery from the reading desk.

Mr. SEDDON took the opportunity of seconding the vote of thanks in order to say a few words in reply to Mr. Papworth, though he was afraid they would never agree. He (Mr. Seddon) *did* want a man who could think for himself. They were talking about art-work, and though he would give place to no one in taking pains to furnish designs, with detail drawings or models sufficient to secure the proper execution of such designs, yet he found that if life were wanted in the work, it was necessary not to trammel the workman too much, but rather to lead him into one's own train of thought, than to think entirely for him. A short time since he had been riveted by the quaint fancy shown in an ancient iron handle to a church door, which the workman, by two or three strokes, which no drawing could have taught, had made into a dog's head in the most spirited manner. Now he (Mr. Seddon) *did* want to see workmen, while following the type of work given them to do, yet able to grasp the idea, to model it thoroughly, and to give it a character and life of their own, which, depend upon it, was the only life possible to be infused.

Mr. WHITE, Fellow, in reply upon the foregoing discussion, wished to say that he took up this subject chiefly as bearing upon the principles, without professing to go more minutely into the details of the question than was necessary for illustration, otherwise he should have occupied two hours of their time instead of one. He felt sure that if Mr. Papworth had understood the plan and section, and construction of the cast railing which was given as an illustration, he would not have made those objections to it; but his observations were more true as to the construction of the mediæval scroll work, although even here he evidently had not looked closely enough into the drawing to see that the band he referred to was divided in plan, and not in elevation; and therefore his remark did not apply. But Mr. Papworth had denounced the art-workman, and deprecated all attempt to revive him, on the ground that by thinking for himself and exercising his own judgment, he carried out his own ideas instead of Mr. Papworth's. He (Mr. White) contended that was not because the artist-workman thought for himself, but because he had not been taught *how* to think rightly for himself, or in any way to throw himself into the thoughts of the architect who might direct him. He was afraid his friend was rather looking to arrive at the golden shore, of which mention was made in the paper, without undergoing the toil needful for its attainment. It was not that we did not want the artist-workman. True he did not want a man who would think in his own way, regardless of the thoughts of him by whom he was employed; but he wanted a man to learn and take in *his* way of thinking instead of his own. It was not from the little sketch that he put into his hands that he wanted him to work; that system, of which there was a great deal too much, only unfitted the workman for proper learning; but it was the large and full-sized detail that he wished him to reproduce: not in the "shears and file and cold chisel" manner he had spoken of, not by the mere cutting out of bands from the bar, or of leaves from the plate, however accurately he might therein follow the outline. Mr. Papworth wanted an exact following of his drawing, neither more nor less; he (Mr. White) knew that manner and finish were things that could not be shown by drawing, and hence the need of thought and knowledge in the artist-workman. It was at the present day considered one of the greatest feats of smith's work, to acquire the power of "drawing" quickly and accurately a bar—say from an inch each way to a quarter of an inch each way, by the hammer and hand alone. A man who could do that, would be able to do nearly all they required.

The CHAIRMAN, Mr. FANSON, Fellow, remarked that he would not say more on the subject which had been brought before them this evening, than to express his conviction that both wrought and cast iron were proper vehicles for art and architecture.

The vote of thanks to Mr. White having been carried unanimously, the meeting adjourned.

Illustrations of Ironwork.

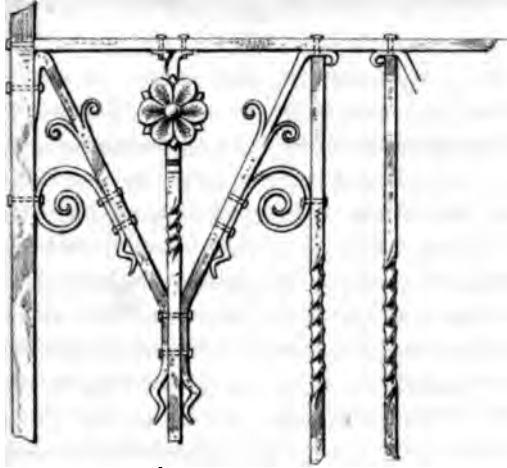


Fig. 1.

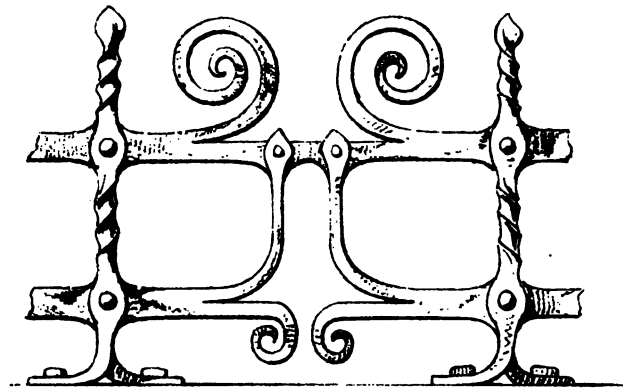


Fig. 2.

Figs. 1 to 4. Wrought Work.

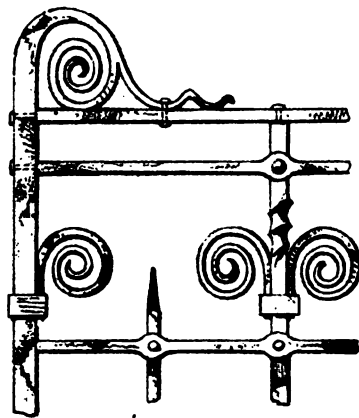


Fig. 3.

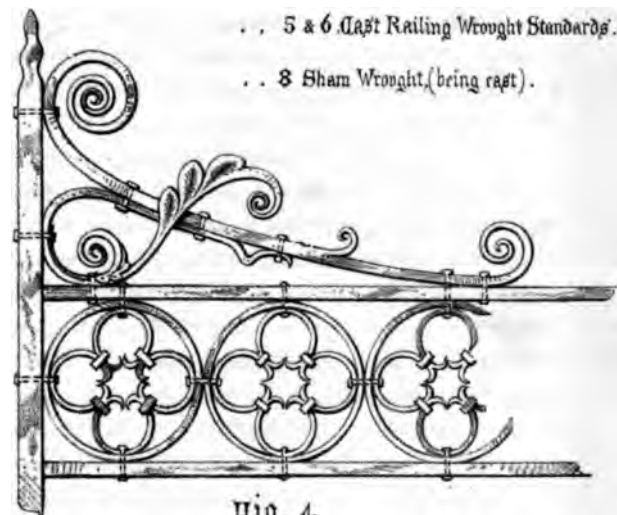


Fig. 4.

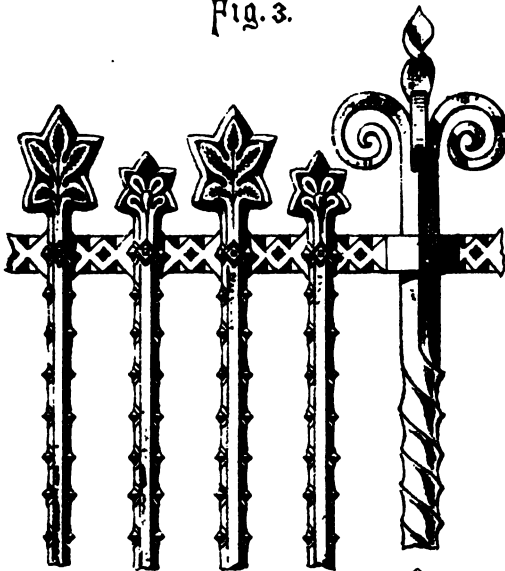


Fig. 5.

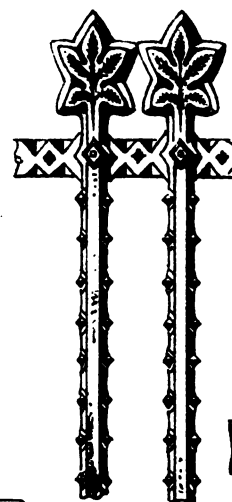


Fig. 6.

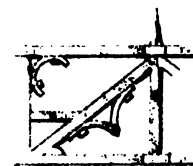
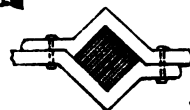


Fig. 8.



Fig. 7.



Plans



William White. F.S.A. Archt.

ART FOLIAGE.

BY JAMES K. COLLING, Fellow.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, 4th December, 1865.

ALL foliated ornamentation of whatever period or nation; whether it be of carved stone, marble, or wood; or whether it be of paint, inlay, or of any other form of decoration, can all be clearly traced as having been originally taken from natural foliage. Nature from the earliest times has been the great store-house from which those beautiful forms of conventional art, which have been handed down to us, have been drawn. But it has been rendered at different times and by various people in a very different manner. Thus we have the severe simplicity of the Egyptian, the more natural manner of the Assyrian, the beautifully conventional treatment of the Greek, and the full and overloaded foliage of the Roman. From these sprung the later developments of the Byzantine and Romanesque, out of which, again, arose the Gothic. The early Mediæval styles were essentially foliated in their character, as in the early French, and in England, perhaps, no architectural foliage has ever excelled that of the early English period; for purity of line, boldness of treatment, and fine effects of light and shade, it stands pre-eminent. It is, however very conventional, and in the present day there is great danger in foliage becoming too highly conventionalized—it gets reduced to certain set forms, and similarity in the manner of treatment. Nature becomes at length to be dispensed with, and then the artist falls into repetition. The early English foliage is very beautiful, but too conventional for the purposes of modern art; it is engrafted with and forms a portion of the architecture of the thirteenth century; we can, therefore, only use it in the nineteenth as a resuscitation or a revival, but it can never form a part of the architecture of the present age. The artists of the latter part of the thirteenth or the beginning of the fourteenth century appear to have seen the danger of their ornamentation becoming too conventional, and resolutely went forth again to seek the aid of nature. During the short period which followed, therefore, and which has been called the Early Decorated, foliage was taken more directly from nature; but it was scarcely developed before it became overloaded with light and shade, and elaborate undulations on the surface of the leaves.

It is necessary to be extremely careful lest ornamentation should become too conventional, for it leads to the same form being too often repeated, and let it be ever so beautiful, it at length descends to mannerism, and nature becomes entirely lost sight of. This is seen in the foliage of the Perpendicular period. Much of it is very beautiful, but the mannerism of the time is seen everywhere, producing monotony and sameness. The hand of the workman, by constant reproduction of the same form, becomes machine-like, and there are no fresh and distinctive features in his work, which associate it with the variety and ever-varying forms of the original types in nature. Foliage may either be too conventional or too natural—the happy medium is the most preferable. That which is wrought in this, the nineteenth century, should be imbued with nature, and not be a copy of any particular style or period; for, if it be a reproduction of that which is past, let it be ever so successfully copied, it is but speaking to the present generation in a dead language.

In the treatment of foliage, for the purpose of art, it must, more or less, always be made geometrical, and arranged with symmetry in accordance with its situation and purpose. One of the first things to be studied is the arrangement of the branches which constitute the leading lines. These form the skeleton upon which the whole is formed, and they should be made such as will best harmonize or con-

trast with the architectural or other lines which surround the composition. In the second place, the forms of the leaves and flowers have to be considered, and to be altered or adapted from nature as circumstances may require. In the third place, and one of the most important points, requiring great study and consideration, is the effective arrangement of the light and shade. Then there is the position it is intended to occupy, whether internally or externally; whether it has to be placed close to the eye, or at a height; and, lastly, the material in which the ornament has to be executed.

There cannot be a doubt as to the existence of the "beautiful" in nature, for all our ideas and notions of beauty in the abstract must be founded upon nature; but, although everything is beautiful in some way or other, yet we draw an immense distinction between the different kinds of beauty. One object is beautiful for one thing, and another for another. Other objects, again, we denominate "very ugly," but it is only so by comparison. In some respects they will be beautiful. Everything in nature has some redeeming feature.

It is not so in art. A work of art depends more upon one kind of beauty—beauty in one direction only—and its powers of pleasing are limited, and should it miss the one object or intention, it becomes an unmeaning and useless work, and not a work of art. It therefore behoves us to be extremely careful in selecting from nature, and the eye must be educated by constant study and examination of the best works of the old artists, so that it may become facile in appreciating that which is in nature suitable for the purpose required. The difficulty is to seize upon the beauty which we recognise and accept as beauty in nature, and so adapt it to our purpose that our sculptured ornaments may not only tell their own tale, but add to the general beauty of the work when they are in position. Ornament may be very good, but it may be thrown away by being either put in the wrong place, or its not being fit and suitable for its situation. The height, therefore, at which work is intended to be placed should be constantly kept in view. It must necessarily follow that an ornament, if intended to be placed 30 feet high, should have fewer lines, and should be more simple in composition than when arranged to be placed near the level of the eye; and, if intended for a greater height, should, of course, be of greater simplicity still.

In the study of any definite subject it is always necessary to go back, if possible, to all first attempts, for in these we often see a vigour and an amount of thought for which we look in vain in later developments. In these early works we see clearly what those first workers thought, and what they attempted to express. In almost all late work, we have but too often mere second-hand variations upon that which was done by the earlier craftsmen, and by far too finished representations of the original thought, which was usually stamped with vigour and decision, although the mere execution might be rough. Most late work shows a wonderful advance in skill, but not in art. We should strenuously endeavour to avoid this pitfall. Let us henceforth appeal more to the head, the hand, and the chisel, rather than to glass-paper and finish! Let us have sharpness and decision, in preference to smoothness and minutiae!—the vigour of life and thought and not the tameness or pallid beauty of death!

In nearly all periods of art animal form has entered largely into every species of decoration, and has been closely interwoven with forms taken from the vegetable kingdom. There are various modes of rendering these forms for the purpose of suiting them to their several uses and positions, and a research into the principles which guided the artists of old would be of the greatest value. Take, for instance, the conventional rendering of the lion—what numerous types it assumed; first in the Egyptian, then the Assyrian, afterwards followed by the Greek, the Roman, and so on, age after age, through the Romanesque and Mediæval periods, down to the sixteenth century, each age stamping upon it the peculiar characteristics of its own art feeling, often teeming with ideal fancy, and yet imbued with sufficient natural character to establish its identity.

The highest class of foliated sculpture is that which expresses some thought or idea beyond the mere combination of leaf form—not exactly by a representation of the thing itself, but by adopting some form of expression which will be symbolical of that which is to be pictured forth, the meaning of which is rendered sufficiently clear and expressive to those who attempt to look beyond the mere surface of things. It is much to be regretted that language by symbolic ornamentation should be now so much neglected!—that we should be content with copying and recopying foliage which is not only bad in form, but utterly meaningless in its application! Yet the symbolic form is the most ancient mode adopted by mankind to express their thoughts, and the symbolic form of ornamentation followed as the most natural means of decorating their works. Let us look for a moment at the meaning and force of expression in some of the most

Fig. 5.



ordinary of the Egyptian ornaments. As, for instance, in an ornamental border from a mummy case (Fig. 5). Here the closed bud of the lotus, the sacred lily of the Egyptians, are represented as appearing through the conventionally expressed water, while the fully expanded flower speaks of the waters having receded. The Egyptian cast his bread upon the waters of the Nile, hoping to find it after many days, and the plentiful appearance of the lotus told of the lowering of the waters, and gave promise of an abundant harvest. The lotus, therefore, was the welcome harbinger of plenty, and came to be regarded as an emblem of faith, speaking of a happy land, where this worshipped flower would henceforth bloom eternally. It may, however, be said that all such symbolic form of ornamentation is useless in our age—that we have a comprehensive written language, which will express our thoughts much clearer and more perfectly than by any such means. True, but symbols are the poetry of form, as verse is the poetry of language, and we are not so rich in poetic feeling that we can afford to give up this, humble as it may be. It is a language that all ages may translate, if they do but search for the thread which leads to its unravelment.

Mediæval artists speak to us of the Trinity by their triple foliage and other triune arrangements of form, and of their faith, by the loving way in which they dwelt upon and developed so many beautiful forms of the cross. Heraldry, again, was a language of symbols of the most interesting character, and heraldic symbolism entered very largely into mediæval decoration. It is still used to a limited extent, but it would be well if it were more studied, and its forms introduced among the ornamentation of domestic and other buildings. Monograms, also, if judiciously treated, and not too often repeated, are useful auxiliaries to ornamentation. There are several drawings on the walls in which a symbolic meaning has been sought to be given. As the parable of the Lilies of the Field, rendered somewhat after the Egyptian manner; the parable of the Wheat and Tares, as well as that of the Good and Bad Trees.

Wall surface forms the plain ground to architecture, as the canvas forms the ground to a painting, and it requires various modes of treatment to bring it into harmony with the architecture which it

accompanies. We too often treat it as a mere uniform plain surface of stonework; but of late years we have acknowledged the value, in most of our modern churches, of following the old examples, by putting wrought quoins and dressings, and filling in the remaining wall surface with rougher and smaller stones of a different tone of colour. The advantage of this was pointed out by Pugin, in his "True Principles;" and architects have followed his advice ever since. It is a species of enrichment, by the aid of stone lines and colour, of the plain surface of the walling. Some architects have run to most outrageous lengths, and have striped up their wall surfaces with violently contrasted brickwork and other materials. This is, however, all working in the same direction, to gain, tone, colour, and enrichment upon plain surfaces, although it is often done without much judgment.

The early mediæval artists decorated many of their wall surfaces with sculptured or painted diapers, which were frequently introduced in the most artistic manner. The classic architects felt the same want as the mediæval—the necessity of treating ornamentally some of the plain surfaces of their walls; but, with the exception of their beautiful treatment of the figure for wall surfaces in friezes, they arrived at a much less happy result. The early Italian architects appear to have recognized the value of rough walling in giving tone and colour to their surfaces, and in imitation of this they proceeded, in their more finished works, to mark the joints of their stonework by strongly indented lines. This has come to be termed "Rustication," and the channels, "Rustics." The surfaces of the stones, also, were often left rough to gain more tone and colour. This was, however, nothing more than another mode of gaining a diapered surface for plain walling. In later work, the artists frequently picked out the surface of their quoins in senseless imitations of rockwork or vermiculated work, instead of which how much more elegantly they might be filled with foliated designs, either incised, or the ground sunk, leaving the ornament flat.

The foliage of the Anglo-Norman period is remarkable for great vigour and expression. It frequently contains the most clever developments of elegant lines combined with great simplicity of light and shade. The happy manner, too, in which the animal form is united to the foliated is very graceful. It is strange, however, that hitherto it has been the custom to consider the sculpture of this period, although acknowledged to possess some merit, to be, nevertheless, rude and barbarous. It is true that there are many of our Norman buildings which do not contain much sculpture beyond zig-zags, beak-heads, billet mouldings and cushion capitals; but there are parts in others which indicate a wonderful amount of art feeling, and will amply repay the most careful study. Among the Norman doorways, especially, there are sculptured portions remaining which evince the highest artistic spirit and power. The sculpture of this period is not highly finished. The trace of the tool, used in the most decided manner, may still be seen in many examples, evidently showing that the sculptor used it as the true artist would the brush—feeling only its value as a means of expressing his own mind, of creating those forms which he loved to picture forth, and not using it to give only smoothness and finish. We cannot help being struck, when looking at one of these works, that these men possessed a something—an artistic mind and hand—beyond what we possess at the present day. How is this? We have progressed in nearly everything, but in the true artistic feeling in architecture we appear to have retroceded. It is of no use blinking the matter, but such appears to be the truth.

The manner of treating the ground of their carved work shews in what spirit these old sculptors worked. It was not made smooth and all of one uniform depth, but as deep again in one part as it was in another, according to the intensity of shadow required, thus showing that they valued it simply as a background to their picture. We too often are only anxious to produce a neat and uniformly smooth and even ground, sometimes taking more trouble, and giving more thought to the ground than the carving itself, forgetting that the sole use of the ground is to produce shadow as a setting to the sculpture, in the same way that a dark background is made to heighten the artistic effect of a painting.

As a general rule we are afraid of recessing the ground to our carving, not appreciating its value in developing the beauty of form, or of adding brilliancy to certain parts by intense shadow. Instead of seeking for the light and shade upon the surface of the carving itself, as is too commonly the case, the ground should be driven back, without the slightest compunction, until the necessary contrast is obtained.

Very little undulation of surface is necessary in the sculptured representation of leaves; but the ground should be deeply recessed for shadow, so as to give value and brilliancy to their radiating or other forms, which would be marred by too much light and shade upon their surfaces. This is a point specially to be attended to, in order not to lose the beauty of form when it has been once secured, either by making the form too detailed, or putting too great an intricacy of light and shade, so as to interfere with it. Simplicity of composition, both in form and light and shade, is a point at which the artist should most strenuously aim. It is far easier to get into minute complication and subdivision than it is to adhere to simplicity. Complication is a power which is very attractive, it is often mistaken for beauty, and it is one which is not easy at all times to avoid. It is a fault which even nature is sometimes led into by the cultivating hand of man, at the sacrifice of her original and most beautiful forms. This may be easily seen by comparing the cultivated garden forms with the simple and original wild ones.

We see thousands of beauties in nature on every side of us, and if we only knew *how* to apply them to our own purposes, we should be able to create a new world of art beauty. But that is what we have to ask ourselves. How can we apply these elegant forms and subtle combinations? We are puzzled and amazed at their wonderful intricacy and perfection—and yet how imperfect! We attempt to analyze the beauty of natural lines—but how often they upset all our own laws of beauty! If we are tracing the intricate network of a leaf, we are delighted at the elegance of the curves; but all at once we come to a most awkward turn—a wilful kind of vagary that entirely disagrees with all our notions. We cannot see why, nor wherefore, but are obliged to give up our search and return to our own beaten path—our time-honoured way of producing what we term “the beautiful.” We smooth all down to our own tangential curves and lines. We see nature literally revelling in all kinds of odd corners and junctions, without two forms being alike, “kicking over the traces” in every direction; and yet all is beautiful! Beautiful without effort—it seems even beautiful without being able to help being beautiful! We see the beauty, we acknowledge it and appreciate it; but how can we apply it? We seize upon it, we work upon it, and we think we have it securely and firmly at last, but unfortunately it somehow flies from our own grasp, and nothing is left under our hands but a dull dead form. We may have been very near success, and yet have failed time after time. The life and the vigour which should stamp our works with beauty are not there.

How often will such thoughts as these occur to those artists who closely and ardently study nature for the purpose of applying its forms to art! But this should not produce discouragement; for, with steady perseverance and study, at last will come a sudden thought, created, it may be, by a happy state of mind, or by some new point of view, which will quicken our every day forms, and enable us to add that life to our works, without which all our efforts are of little value. Often may we have walked over the same country, or have examined the same flower, without our being able to detect anything uncommon in it; but something may happen to draw our attention to certain features, which will cause us to see beauties of which we were before totally unconscious. It suddenly becomes an old friend with a new face. We are then in a position to take advantage of our fresh views for the purpose of art:—

“ — But still must needs confess

That 'tis a thing impossible to frame
Conceptions equal to the soul's desires;
And the most difficult of tasks to keep
Heights which the soul is competent to gain.”

WORDSWORTH.

To adapt nature successfully to art purposes, it is absolutely necessary to study it intensely and constantly, and while it is in full vigour and life. It will not do to draw only the dead inanimate form. Nature should be watched and examined at different times of the year, and viewed in different positions. Every part of a plant should be carefully drawn that strikes the eye as elegant,—the beautiful little leaf-buds as they unfold themselves, giving, as they do, some of the most elegant and energetic lines that can be conceived; the leaves, with their form and modelling, their mode of springing and clasping the stem; the construction of flowers; and then the seed vessels and fruit. Every part requires to be examined with attention, often with the aid of a powerful magnifying glass, and carefully drawn to form a store for future use in designing for ornamental art.

Strong decided lines and freshness of form are so frequently contained in leaf-buds and all young developments of plant growth, that they offer an extensive field for all who are in search of elegant form. The folded and half-expanded leaves, also, give frequent charming suggestions. The fresh and delicate colour of leaf-buds, and their contrast with the older and more sombre parts, is in itself a study which cannot fail to lead to important results, if pursued with an appreciation of the delicacy of contrast and the harmonious combinations of self colour. Their arrangement and delicate plaiting is sometimes highly symmetrical and regular, throwing out strong powerful angles, which appear almost as if standing ready for the adaptation of the carver.

Buds issue from the axilla of the leaf-stalk as shown by the buds of dog-wood (No. 1, pl. I). The old leaves having been shed in the autumn, and the young buds commenced to grow on the return of spring. When the leaf falls off in autumn the young bud is protected from the frost by numerous scales and envelopes, which burst and fall off in spring as the bud opens, as shewn by the bud of the horse chestnut (No. 2, pl. I). The scar left by the old leaves is plainly seen in the horse chestnut long after the leaf is gone. Opposite or cruciform growth, with firm fleshy leaves, is seen in the wild mint (No. 3, pl. I). The smaller example (No. 4, pl. I) shews how a bud may be frequently studied to advantage—that is, by dissection. It has one of the outer leaves removed, shewing the inner bud reposing in the hollow of the leaf. Others may be drawn in this way, after the outer leaves have been stripped off, and shewing the very embryo of the bud, but should be magnified perhaps to twenty or thirty times their natural size. Delicate little forms, of the most exquisite grace and beauty, may thus often be found which would otherwise totally escape notice. The innermost recesses of nature must be brought forward to the light, and nothing, if possible, left unobserved and unnoted. Unless gone into in this manner, and with an intense determination to study every part, whether large or small, one can hardly say that he has been observing nature in search of the beauty of form. Who would have imagined that the minute ivy-buds (Nos. 5 and 15, pl. I) contained such graceful lines as they do? I had looked at them many times before I discovered what they were like, but when I had found them, carefully drawn them, and saw the infinite variety of beautiful forms that they presented, I considered myself amply repaid for my trouble. I have not yet applied them to my satisfaction, still there is an elegance in them, of which others, probably, will be able to make more fortunate use. Look, also, at the minute buds of the common garden rue (Nos. 12 and 13, pl. I). What classic forms can be more truly elegant? Compare it with the graceful pencilling of the colour on the petal of a white geranium (Fig. 6). How

Fig. 6.



symmetrical and yet unsymmetrical! It would be difficult to say for what particular purpose they would be applicable, yet surely, if the mind is stored with such forms as these, their application will certainly follow.

For vigorous lines look at the wild rose-bud (No. 6, pl. I), or the marsh marigold (No. 10, pl. I) with its elegant little flower buds nestling in the hollows of the leaves. Then, also, observe the quaint form of the horsetail (No. 9, pl. I), with its peculiar frills upon its stem. Holly-buds (No. 8, pl. I) have much the character of the Greek scalloped foliage, and the little buds of endive (No. 7, pl. I) put one in mind of sheaths in early acanthus foliage. The ground ivy (No. 11, pl. I) appears as if it might be wrought into a piece of ironwork, while the dead nettle (No. 14) looks as if suggestive as the lower portion of a finial.

Fern fronds, again, more especially when in their young state, when they first issue from the ground in the most minute and delicate spirals, are very beautiful and highly suggestive for ornamentation. The lines that the common brake assumes in different stages is frequently very elegant, and there are many other ferns which are extremely suggestive, as in the perfect fiddle-head form of the polypody, the twisted spirals of the little maiden hair fern, or the quaint form of the lady fern, almost reminding one of a carved arm-rest.

Ferns gave the *motif* to the old carvers to much of their foliage, although, perhaps, it is not very easily to be recognized, as they purposely avoided direct imitation. The brake, however, is to be traced

Fig 7.



in the foliage of our Anglo-Norman period as in the example (Fig. 7) from one of the capitals from the crypt of York Minster. There is also a capital in Shoreham Church, Sussex, which is clearly taken from the fern tribe. A series of stout fronds are springing from the necking, with the voluted heads turning over in the upper part of the bell, and a smaller partially expanded frond below. The brake is also evidently the type of the characteristic curled leaf of the Norman period, but one part of the leaf was made to turn outwards, instead of the whole curling in upon itself, as is the case in nature. The *crochet* of the early French capitals were probably suggested by the spirals of fern fronds, combined with the head of the classic leaf or the angle volutes of the Corinthian or composite capitals.

It is not necessary for me here to explain the different forms of leaves. They vary from the most simple to the most complicated, and embrace some of the most elegant forms which can be imagined.

The modelling of the surface of leaves is a point of very great importance, requiring careful study, and is secondary only to the form of the leaf itself. In fact, the form depends very much upon the judicious and harmonious modelling of the surface, for bad modelling, or coarsely-cut lines on the surface, will interfere with, and destroy the form of the leaf, be it ever so beautiful. We see in nature a great abundance of the hollow leaf, from the fact that one of the functions of the leaf is to collect the rain and carry it by its channels to the plant itself. Convex modelling can, however, be equally well studied from nature by observing the backs of leaves. As a rule, carving should never be over-modelled on the surface, but kept simple, and with just sufficient flow to prevent its looking stiff and formal. There should also be variety, as in nature. Unfortunately, modern carvers cannot understand simplicity of modelling, and they ruin their leaves by lines and deep shadows.

The Gothic sculptors of the decorated period generally adopted the rounded bulb in the centres of their leaves, which was repeated in each of the lobes, often giving such an amount of sharp light and shade as to entirely destroy the beauty of their outlines. In the Classic, foliage is frequently carved with

deep lines or channels running to the centre of each division of the leaves—no division scarcely ever appearing without its channel. In the early Greek the modelling was much more simple, being worked

Fig. 8.



into a slight V section (Fig. 8), and the outline of the lobes of the leaves partook very much of a zig-zag line, and the eyes separating the lobes were circular. The foliage from the Monument of Lysicrates is of much the same character, and the V section is preserved; but the lines are more flowing, the outline is more *spiky*, and the work has apparently a very high degree of finish. The foliage shewn in Fig. 9, is part of the husk, out of which

Fig. 9.



spring the very beautiful scrolls on the roof of the monument. If these two last examples, which present the type of the Greek acanthus foliage, are compared with the natural leaf of the *Acanthus mollis* (No. 6, pl. II), from which this foliage is said to be taken, the likeness will not be found very striking. It is like several kinds of foliage, without being a copy of any one example in particular. Compare it with the thistle (No. 2), which appears to have much of the zig-zag outline. We have the sharp, spiky lobes again in the *Grevillea Acanthifolia* (No. 7), an example obtained from Kew Gardens, but from what country it comes I am not at all aware. In the sea holly (Nos. 3, 4, and 5) the head of the acanthus leaf, as it turns over in leaves of the Corinthian capitals, is seen to be a perfectly natural formation. These examples serve to shew that the Greeks adopted certain principles in nature, and that they did not confine themselves to a servile imitation of any particular leaf or plant.

The sharp foliage of the Greek is never found in Roman foliage. What is called the acanthus leaf

Fig. 10.



of the Romans is as different as possible from the acanthus of the Greeks. In the Roman, all the lobes are rounded, or nearly so, and the moulding of the surface of the leaf is extremely violent. The part in which the eye occurs, forming the main divisions of the leaf, being sometimes worked up almost like a pipe; as in the leaves from the capitals of Mars Ultor (Fig. 10) and Jupiter Stator at Rome (Fig. 11). Now these, with the Greek, form two very distinct and separate types of what is called classic acanthus foliage.

Fig. 11.



There is, however, another variety of foliage in the Roman, some of which is said to be of Greek workmanship. I allude to the very rich friezes from the Trajan Forum at Rome, and the frieze and pilaster preserved at the Villa Medici, and other examples of the same class. This foliage appears to be taken from soft lobe leaves, such as the chrysanthemum (No. 8, pl. II), and the yellow-horned poppy (No. 1). The lobes are not exactly round, but the points are obtuse and soft, and, like the natural chrysanthemum leaf, each lobe has sub-lobes, besides other still more minute divisions. There are thus, two principal antique types of the acanthus—the sharp and spiky-lobed foliage of the Greeks, and the round and soft-lobed of the Romans.

In the styles which arose after the commencement of the Christian era, the ancient Greek appears to have been the type followed for the foliage of the Byzantine or Eastern art, while the Roman gave its colouring to the foliage of the Romanesque or Western art. In the foliage from Santa Sophia and the Church of St. John at Constantinople, which were probably erected by the Emperor Justinian, the

Fig. 12.



similarity to the ancient Greek foliage is plainly seen, as in the example (Fig. 12) from the Church of St. John. The Byzantines also erected churches at Jerusalem, under Justinian, but of which little more than one fragment is supposed to be remaining, known as the Golden Gateway. This has been ably illustrated and described by Comte de Vogüé, in his work lately published, on the *Temple of Jerusalem*. A diagram of one of the leaves from this work is given (Fig. 13), which is evidently of Byzantine workmanship, and has a strongly marked Greek character.

Fig. 13.



In the Early architecture which followed the Roman, the foliage retained the round lobe, although there are many cases where it is evident that there has been a Byzantine influence acting upon it. This may be distinctly seen in our own Norman foliage, where the V section of the Greek is continually made use of. In the early French capitals of the eleventh and twelfth Centuries we see clearly the classic type of the Roman foliage. In the foliage of the choir, and Trinity Chapel of Canterbury Cathedral, which is precisely of the same character as the early French, and without almost a single exception, the foliage will be found to be round lobed. The example (Fig. 14) from a capital in the South transept of Canterbury, is precisely of the same character as the leaves from Mars Ultor at Rome.

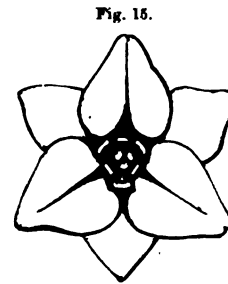
Fig. 14.



But, to leave the subject of leafage, I would say a few words, in conclusion, upon flowers and fruits. Of all things which exist in nature, flowers, perhaps, are the most universally allowed to be beautiful. The variety of their bright and lovely colours, with their great difference and elegance in form, united to the exquisite odours which many of them possess, have recommended them from time immemorial to our senses. Where can we see a scale of colours such as we find in flowers? Colours of the brightest hues, as in the scarlet geranium, or of the most exquisitely soft and subdued tones, as in the tea rose. Then, again, we have the most charming mixtures, combinations, and contrasts, as the yellow, purple, and white of the *gilia tricolor*; the purple, orange, and green of the woody nightshade; and many others. How beautifully the greens of the leaves

of plants are made to harmonise with the colours of their flowers? The bright green leaves of the yellow flowers, the dull neutral greens of the blue flowers, and the reddish-green leaves of the red flowers, all show from what consummate palette the various combinations have proceeded. It would amply repay any one who would study the subject of colour in flowers, and no doubt it would add much to our knowledge of the use of colour in art, if the subject were carefully explored. The forms of flowers are very various, but they are mainly divided between those which radiate from a centre, as in the common daisy, and those which are symmetrical or alike on each side of a centre line, such as the pea and bean. The first of these divisions, the radiating, are the flowers which are mostly used in art decoration. Flowers which radiate from a centre are often formed upon the triangle, as the lily, shewn

by the diagram (Fig. 15), suggesting the form of the six-pointed star or double triangle. The triple arrangement is seen again in the wood anemone, with its involucre of three leaves below the flower; also in the iris or fleur-de-lis, which has three petals turning up and meeting in the centre, while the other three, alternating with them, turn downwards in a very elegant and graceful manner. This flower was the type of many of the conventional forms of the Anglo-Norman and Early English foliage. Flowers of four petals are not numerous: but the minute flower of the rue is a beautiful example arranged upon the square form. The bud of the flower shows the four petals folded, and the next figure



gives the flower fully expanded, and shows its perfect cruciform arrangement. The petals are hollow, with the edges folded, and in the hollows lie four of the stamens. In profile one of the petals is shaped almost like a Gothic crocket. Although so minute, and so utterly insignificant to the naked eye, yet when looked into and examined with a powerful glass, it is one of the most quaint and interesting flowers which can be met with. The seed vessel, when dry, opens into an elegant little quatrefoil.

The cruciform arrangement of leaves and flowers was used at an early period of mediæval architecture, in square diaper work, and from the convenient form it assumed, the square flower, as it is technically called, remained a favourite to the latest period of mediæval art. Its type in nature is more clearly seen in plants and trees bearing opposite leaves, when looking upon the extremity of the branch, as in the lilac and maple.

The most common number of petals in flowers is five, as in the common dog rose, primrose, cinquefoil, and many others. In the garden convolvulus the pentagonal form is very beautifully developed, and the scarlet five pointed star is charmingly inlaid on the rich purple ground. The pilewort crowfoot has eight petals with a triple calyx, and the coreopsis also has eight petals, each with triple ends. The comfrey and heliotrope grow in a spiral form, offering a beautiful suggestion for decorative treatment.

The cuckoo pint, or *arum maculatum*, has a very peculiar flower. It has no corolla, but the stamens stand up within the spathe or hood in an oblong oval spike, and the ovary is concealed below. This plant is said by Monsieur Viollet-le-Duc, "to have inspired our sculptors from a very early epoch." I have not, myself, observed any indications of its introduction in early work in this country, but it is evident that in later work—the fifteenth century—it formed the *motif* of many of their flowers, as in the example (Fig. 16) from Swaffham Church, Norfolk. There are many other flowers in "perpendicular" work of the same type, consisting of a large seed, surrounded and growing out of foliage, and which were probably taken from the arum.



In the Renaissance and Italian styles it was common to introduce large bunches and massive swags of various kinds of fruit, strung together with leaves in the most artificial and inartistic manner. Unfortunately, and to the destruction of all good taste and natural feeling in foliage, the same form of decoration is still very largely pursued in numbers of our modern buildings, both in England and France. It is far better to introduce fruit as naturally belonging to the foliage that it accompanies, and for its beauty and opposition of form.

In mediæval decoration fruit is not much introduced among foliage. The maple is sometimes accompanied by its winged seeds, and the thorn by its berries. The oak is frequently shown with its acorns, and the vine with its grapes, sometimes also nuts are introduced with the hazel. Beyond this, fruit is seldom seen; but there can be no reason, if the fruit will add to the beauty of the work, why it should not be introduced more frequently.

As a general rule all carved ornamentation, placed upon a surface, whether it be of leafage, flowers or fruit, should be carved out of, or within, the surface itself. There are exceptions; as, for instance, when extreme boldness is required, parts of the ornament may be advanced far beyond the line of surface. Still the ground from which it springs should be recessed or sunk; that is, the subject should be laid in a panel. It gives truthfulness to the work, and avoids that stuck-on appearance so commonly practised in modern architecture, which appears to be constantly looking out for projections upon which to place ornamentation. As upon pediments, cornices, key-stones, and other parts projecting beyond the general surface of the work—not at all taken out of the surface, but added to it—they become parts stuck upon the structure. The ornamentation is placed outside, hanging frequently in festoons over the surface to be decorated, resting upon it or added to it, instead of being formed within it, and becoming a portion of the work itself. Architecture becomes a mere peg upon which to hang the fancies of the decorative artist, whose object is to cover up the architecture wherever he can extend his ornamentation—a system which must lead architecture to the lowest depths of degradation, for ornamentation thus appears to be endeavouring to usurp its place—a vicious principle which cannot be too strongly condemned.

THE PRESIDENT, MR. A. J. B. BERESFORD-HOPE, expressed his hope that this most excellent and interesting paper would not pass away without giving rise to a discussion, inasmuch as many of the points raised deserved consideration and debate.

MR. WM. WHITE, Fellow, said, having been much interested in following Mr. Colling's paper, through all its details, he would offer one or two remarks on the subject which had been brought before them. Mr. Colling had explained to them some of the systems of outline, modes of dealing with ornament, and so forth, in early work; but he went on to lament that there appeared to be no originality of thought and feeling, somehow or other, in modern or even in late mediæval works. Mr. Colling did not, as far as he understood, pretend to say how it was that character and feeling had been lost, but he lamented the loss. In the earlier part of the paper it appeared to him Mr. Colling had himself supplied an answer to the very question which he afterwards raised. There could be no doubt whatever that the cause of that degeneracy had arisen almost entirely from the increasing practice of a mere imitation of the outward expression of the form, rather than the following of the systematic and symbolical and poetical treatments which pervaded the whole of the foliage of the earlier periods. He said this, because it was in those earlier periods, as Mr. Colling had observed, the greatest power and the greatest feeling were displayed in the foliage. And it was found that in those times they did give prominence in all their works to the botanical and organic construction of the plants, and followed a systematic and symbolical and poetical arrangement in all that they did. He knew it was the fashion in the present day for many to say, "It is all very well to profess to follow a symbolical arrangement, but what is the good of symbolism if it can be read by none but by those who are initiated or instructed in all its interpretations?" He said it was not necessary for everyone exactly to interpret all that had been expressed therein; but it was evident that where any such essentially systematic and intelligent arrangement had been followed, there they would find the most perfect and most beautiful expressions in art, which appealed to them, not because the exact mode or nature of their arrangement was evident to the popular eye, but because it was there,—pervading the work. Reference had also been made to the subject of the colouring of flowers. Colour was a subject which he (Mr. White) had studied to some little extent, from his own intense delight in colour itself. And Mr. Colling had referred to the manner in which the foliage and flowers of all plants, diverse though they were in their several kinds, thoroughly harmonized throughout. It was a fact, though perhaps not generally known to those present, that if they picked to pieces the stem and leaves of any plant, they would often, by the naked eye alone, and invariably by a careful microscopic examination, find traces of the colours of the petals

and flowers in those leaves and stems. He said this was a fact which they would do well to take up and work out for themselves,—a little more scientifically than was commonly the custom now-a-days to pursue such studies,—and it might be followed out by illustrations, drawn perhaps to a large scale, in order to test the effects of such treatment in the general harmonizing of colours,—introducing similar minute fibres of different colours within the other, which should show how and to what extent those harmonies existed. There was one other point, as to fruit not being so commonly used in mediæval work as, it was alleged, it ought to be, and indeed might be. He thought there was good reason for that. He thought the chief botanical elements of construction and organization were much more visible in all the parts of flowers—in the leaves, buds, petals and other parts—than they were in the full fruit, and the botanical elements of the fruit itself were only to be seen when it was dissected; and fruit was intended rather to be enjoyed by dissection of another sort—in the eating—than in its representation in wood and stone. He had great pleasure in moving a vote of thanks to Mr. Colling for this very interesting paper, and he hoped some others would also express their views upon it, from which they might pick up a few further ideas.

Mr. EDWIN NASH, Fellow, said, that following up the remarks which had been made, he would observe that no special notice had been taken this evening with regard to the geometrical forms of flowers, which, in fact, possess an immense variety of mathematically geometrical forms. Taking the very familiar thing—the ivy leaf—it is found that many of the leaves are composed of double triangles, and this was only one of numerous instances. Architectural foliage usually requires geometrical arrangement, especially in surface ornamentation, as Mr. Colling so well shows by the numerous and very beautiful designs which he has produced. He had great pleasure in seconding the vote of thanks to Mr. Colling.

Mr. DIGBY WYATT, Fellow, had much pleasure in drawing attention to a point of great merit in Mr. Colling's contribution to their entertainment and instruction. He could not but feel that scant honour had been done to that gentleman with respect to the really noble industry he had displayed in providing such copious and beautiful illustrations to his paper. Mr. Colling had not only studied and thoroughly elaborated his essay, but he had brought before them tangible and graphic evidence of the importance of his theme alike to the student and professor. Mr. Wyatt thought that there was one point which had a little slipped from Mr. Colling's attention in dwelling upon the various special conditions which generally served in practice to determine the artistic treatment of foliage,—that was the process of execution or manufacture by which the required ornament had to be produced. Upon this,—upon the character of the material in which the decoration had to be wrought,—and upon its position in relation to the points of vision, and the sources of illumination, were to a great extent dependent, not only the form of all well designed ornament, but its relative intricacy or simplicity, together with the mode in which its leading lines and parts required to be set out, both on the surface and in section. Another extensive branch of investigation might take its point of departure from the paper the meeting had just been favoured with, viz., the questions as to the extent to which direct imitation of nature might be carried in ornamentation with successful results under varying conditions; and under what circumstances a purely conventional treatment of form became indispensable. Direct imitation of nature had been frequently introduced into architecture, painting, and sculpture, as was well known, with the best effect at various epochs in the history of art; while in what the world had concurred in recognising as master-pieces in architecture, it had also been occasionally introduced ornamentally with very happy results. On the other hand, the educated eye was constantly falling upon direct imitation of nature used for structural embellishment in forms which appeared most repugnant to good taste. It behoved the designer, therefore, to study the conditions which made natural imitation beautiful in one case, and displeasing in another. Important canons for the guide of their practice

might thus be eliminated. Good writers on imitations in the fine arts had never fully treated the subject of the limits under which the architect specially had to work in this respect; though some of the dicta of such writers as Quatremère de Quincy, Winckelman, Dyce, Eastlake, Owen Jones, and Ruskin were worthy of careful notice. The subject of Mr. Colling's paper, which so amply illustrated the unerring beauty of nature, forcibly reminded the speaker of a passage which occurred in the paper by Mr. White, read at the preceding meeting. Mr. Wyatt regretted he had not been present on that occasion, or he should certainly have felt it his duty to enter a respectful protest against such a sentiment as was enunciated in the following passage:—"Utilitarianism may be one *element of beauty* amongst many more important ones . . . Beauty lives in a far higher element; *for the maximum of beauty, in kind no less than in degree, is found mostly with the minimum of utilitarianism.*" Now, he must say that he thought that this was a most dangerous article of faith; because if they considered what really was the maximum of beauty in "*kind*," they would instinctively be led to recognise it in Divinity, and the purest abstract moral qualities. In these they would find the highest attributes of utilitarianism, in a beneficent adaptation to man's necessities, combined with that which was the great prototype of the most ethereal and symbolical beauty. When, on the other hand, they turned to the question of *degree*, they would find that all those subtle beauties of nature, upon which Mr. Colling had so well dilated, were generally referable to some direct use,—some utilitarian end,—essential either to the structure and purpose of the object, or to man's enjoyment of it. Unless a lofty view of utilitarianism was taken and maintained, they would always be liable to misapprehend the wonderful harmony between useful purpose and exquisite form which the divine will had apparently ordained should pervade creation; and which he (Mr. Wyatt) certainly thought the architect, more than any one else, should systematically endeavour to emulate.

PROFESSOR KERR, Fellow, was anxious to support most cordially the vote of thanks to Mr. Colling, chiefly on account of the large number of excellent and instructive drawings which were exhibited as illustrations. One thing which could not fail to arise in the minds of many persons would be that question of the "art-workman," which had of late years been so much discussed. As regards architectural work, this question very much turned upon the enquiry whether the architect could be expected to express with sufficient precision his designs for ornamentation by drawings of his own, or whether some one else must do it for him by modelling. Looking at the drawings now before them he would say, that he had great faith in the idea that the delineative powers of an architect, if directed to the proper style of drawing, would prove equal to the representation of the most difficult designs of foliage. If such a delineative skill could be perfected, the responsibility would of course rest more directly upon the architect; but why not? For when they found an architect complaining that he could not get art-workmen to follow out his ideas,—to supply that "vigour" and "thought," and so on, which were necessary, the suggestion must needs arise—why did he not supply all this himself? The answer would turn on this,—whether delineation on the flat is really competent or not fully to represent the ideas of the designers of sculptural ornamentation. This question was a very interesting one; and being himself accustomed to draw and not to model, and being now speaking to persons who as a rule were accustomed to do the same, and feeling, as he confessed, that it was impossible to introduce modelling into the ordinary education of young architects, he would like to hear the opinion of some others present as to how far delineation on the flat had proved in their experience capable or not of expressing in difficult cases the intention of the designer.

Mr. BURGESS, Fellow, made a few remarks on the difficulty of getting his drawings carried out by the so called art-workman.

Mr. WHITE begged to say one word in explanation to what had fallen from Mr. Digby Wyatt, in reference to "utilitarianism," inasmuch as he might not have expressed himself with quite sufficient

which relied exclusively on indigenous forms of vegetable sculpture. He was sure the meeting would cordially adopt the vote of thanks to Mr. Colling, not only for the paper, but also for the magnificent collection of illustrations which he had hung on the walls. He was only sorry that so few should have seen them; but if consonant with their producer's convenience, he would petition Mr. Colling that they should be left where they were for a few days for better consideration than could be given to them that evening.

Mr. COLLING, Fellow, in reply upon the discussion, thanked the meeting for the manner in which his paper had been received, and he had not much to add upon the discussion. He should mention that, in a paper like this, he had brought forward much more in the way of showing by illustrations than he could describe to them in detail; but he had published a work on the subject, in which he had more carefully gone into the whole matter. In the limits of a short paper it was of course impossible to go thoroughly through every part of the subject. Mr. Nash had referred to the geometrical part of the question. He had already read a paper there on the same subject, in which he had explained the geometrical divisions of leaves and flowers, and he was afraid to touch upon that point again for fear of repeating himself. In reply to Mr. White, he would say he had felt in the works of the present day there was not to be found that art-feeling which they could trace in some of the old works. He could not explain how or why it was. Mr. White said he had answered himself upon this point, but he was not aware of it. While sketching portions of the Norman doorways at Ely he was astonished to see the beauty, feeling, and great expression that was given to the work there—much more than could be seen in modern work. He could not say why they did not get it now; but as far as he was concerned he did not see such work in modern times. With regard to the next point introduced—how far nature should be followed, or to what extent it should be conventionalized, was a difficult point, and it must remain with the artist himself to give his own translation of nature, and develop his own feeling as to the extent of conventional feeling which he would give to his work. But in painted decoration they might have a thing more natural than in sculpture. If they followed nature too literally much of the effect of light and shade was lost. Therefore it was essential to treat nature in a broader manner, so as to get the necessary effect of light and shade in sculpture. He differed from Mr. Morris, and considered that work ought to a certain extent to be of a scene painting character, namely, to gain effect according to the position in which the work was placed. Let it be effective from the distance at which it was to be seen, and too much work should not be put into it lest the effect should be destroyed. He referred to the difference between Roman and Greek foliage. The Greeks always kept it simple in modelling, while the Romans cut up the foliage in such deep lines that they lost the form of the leaf itself. The shadow was as strong on the leaf as it was on the ground. This should not be the case. As to the art-workman, he begged to say he thought he was very necessary, and they had not up to the present time ever met with such a one as they ought to have. He decidedly agreed with Mr. Burges that they might make a drawing as perfect as possible; they might satisfy themselves and others; but when it was carved or worked from it was all a downward process. If they made the drawing ever so good they wanted the executant to work *up* from it, and not *down* from it. [Mr. DIGBY WYATT, Where the drawing was bad the art-workman improved; where it was good he came down below it.] Mr. COLLING added, As to the scale at which nature should be represented, as touched upon by the President, he would say he entirely agreed with M. Viollet-le-Duc in his ably written article 'La Flore,' in his 'Dictionnaire Raisonné de l'Architecture,' in which he said all sculptured decoration in mediæval time was taken from the smallest plants in nature, which were increased to a scale that suited the purpose of the artist, and in large vegetable forms they never found the beauty which was met with in the small species. That was why he referred so much to magnifying objects. It was a wonderful fact in nature, that the more minute it was the more beautiful, and the larger it was the more common-place it appeared.

The vote of thanks to Mr. Colling having been carried unanimously, the meeting adjourned.



ON PAINTING IN CONNECTION WITH ARCHITECTURE.

BY T. GAMBIER PARRY, Honorary Member.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, December 18th, 1865.

UNDER the title of this paper I must not now attempt to address you on the many methods and styles of architectural decoration. That would require rather a course of lectures than one such as this. My subject is essentially that of painting allied to architecture. This subject must soon receive a deeper attention from the leading artists of the day, and members of your Institute. A few years ago it was all but ignored.

Colour as an element in architectural effect is, in public estimation, a novelty. The taste of the last generation was educated in a purism which kept the arts estranged. The poetry of language was indeed allowed the aid of song and harmonies,—but the poetry of form was disallowed all aid from the music of fair colours. The painter, the sculptor, and the architect knew little or nothing of each other's arts. The idea of modulating them into one great stream was hardly dreamt of; and they cared for each other as little as they knew. The public cared for none of those things; and the few who were spared from politics, commerce or fighting, received as gospel the common art tradition of their day that colour was the province of pictures, and that sculpture and architecture were sacred alone to the ideal of abstract form. This was the art religion of the day; all else was sacrilege. There was much truth in it,—so much so, indeed, that with all our emancipation and liberty of conscience in matters of art, we must acknowledge that there is very much to reverence and admire in a school even of such limited knowledge. Its foundation lay in an idea of purity, in a recognition of the excellence of abstract beauty, and in that modesty of art which is implied by singleness of purpose. The very fact of that straining at an ideal so pure was admirable. It was the recognition of the danger of defilement by any element of sensuousness. I fear that our emancipated school of thought in matters of art is too proudly independent. Freedom in art, no less than freedom in politics, needs discipline to make it safe.

The employment of colour in architecture in the times of its greatest perfection is now too generally admitted to need proof or argument. The beauty of nude and colourless forms may be, and often is, very great. But they need to be of the highest art to bear the trial of such nude exposure. Such beauty, the nude beauty of uncoloured architecture, is certainly of the most pure and abstract kind. Architecture is an intellectual creation. It may delight, attract and awe the multitude, and no doubt it does; but I doubt the power of the multitude to penetrate the depth of its poetry. It is too artificial, too abstract, too exclusive of all that is common to external nature to command all hearts. There is a note wanting in its scale. One touch might bring all the refinement of its calculated symmetry into a closer harmony with nature;—one touch might bring the abstractions of human *mind* into closer harmony with the *feelings of human nature*,—one touch alone; and that is the touch of colours.

A thing of colour is a thing of life. A colourless thing in nature, if there be one, savours more of death than life. In art a colourless thing is but a passionless abstraction. It may be, in both, pure and lovely, even though the idea of life may have no part with it. But as life is better than death, so are things which suggest it; and so it results that as nature without colour is inconceivable, so art without colour is incomplete.

How then shall we apply this deduction to architecture? If the composition of its forms have little or no precedent in nature, whence are the principles of its colour to be drawn? I grant the

difficulty, particularly at this time, when people's eyes are so habituated to the poetry of puritan white-wash or to purist nudity, that colour comes upon them as a separate idea, clashing with that of form. I am not surprised at it. It is often less their fault than the artists. Incompetent persons are entrusted with an art, of the delicacy and difficulty of which they have no more idea than their employers. There are few more difficult problems in art than the combination of painting with sculpture and architecture. The result is often most unsatisfactory, and neither artist nor employer know why; and until the province, not merely of each art, but of each branch of it, be clearly recognised both by artists and their patrons, there can be no hope of rescue from that confusion of ideas which now make any harmonious combination of those arts impossible.

From the earliest times to our own there appear to have been three distinct methods of architectural painting in common use. Fresco, encaustic and tempera. There were many modifications of each. Their history is of great practical value to us. The earliest method was that of tempera,—the fixing of colour pigment to a surface by some retentive and protective medium. Size was the oldest and commonest—as used from the days of the Egyptians to our own. Wax, too, appears to have been used by them as a medium in tempera. It becomes a water colour medium by admixture with egg or alkali. It is, however, of little moment to us, except for its archæological interest, what was used in such a climate as Egypt.

In Greece and Italy, the method most valued for its durability was the encaustic. It was very variously used—so much so, that that word came to be employed in any method in which wax formed the principal ingredient. Wax was in all probability the earliest protective vehicle used for colours in the architectural painting of the Greeks. Their earliest temples were of wood, and so too were their statues. It is hard to believe that the maritime Greeks, whose principal emporium was Egypt, could have remained uninfluenced by what they saw there, where every work of art or ingenuity was rich with natural or artificial colours. As they preserved and painted their wooden ships, so would they preserve and paint their wooden temples. The tradition that they did so is preserved by Vitruvius, who states that the Greeks covered the ends of beams or roof timbers exposed to the weather with blue wax. The exceeding softness of the effect of colour used with a wax medium, was just what the Greeks desired. It was used in various ways, with a brush, with a spatula, with the encaustic process, and without it. Wax was also the main ingredient in the circumlitio of statues. The statue-painters were known as *εγκασταί*, i. e., artists who used wax. The advantages of its use on marble, whether of architecture or of sculpture, with or without the addition of colour, were its permanence and transparency, and its resistance of amospheric influences. Examples of painted surfaces from the Theseum, the Propylæa, and the Pinacotheca at Athens, were not long ago submitted to analysis by Mr. Farraday, in England, and to a French chemist, M. Landerer, and in almost every case wax was discovered by them as the medium of the colours. It was also the favourite medium for moveable pictures. A mode of its use is illustrated in a small painting found at Pompeii, where an artist is represented mixing his colours on a stone slab with a fire burning beneath it. It appears to have been the medium most common in use for architectural decoration by the Romans as well as by the Greeks; and it was used for all sorts of artistic purposes throughout the middle ages. Wax is prescribed among the recipes of the Lucca MS. in the eighth century, and in the MS. of Eraclius of the eleventh or twelfth centuries. In the French MS. of Pierre de St. Audemar it is prescribed as a varnish to protect vermilion from the damp and air. And throughout the old documents of English works of art connected with painted architecture, it is mentioned as an ingredient commonly supplied to painters.

In mediæval art, the encaustic system of burning in the wax does not appear to have been used north of the Alps. Wax is prescribed in the French MS. of La Begue, in the fifteenth century, to be

revolution of public taste. It has now gone from one bad thing to another; from whitewash to bare walls. Public taste began to wake to a sense of its own impurity—and then rushed into immoderate use of soap and water. The indiscriminate destruction of early works of English art has been grievous. Much was bad, no doubt: but the good has gone with it, and, what is worse, the record of their composition, the incidents of their history, and the expression of their poetry are gone also. There are, however, scraps enough left to form for us the alphabet of restoration. No geological catastrophe ever denuded a continent more completely than the flood of modern Purism, under the lying name of Restoration, has laid bare the architecture of our ancestors. They have bared its very bones. No martyr was ever more effectually flayed. The finer taste of other days had covered the hideous mortar joints and rough masonry of the interior of buildings with a film of fine cement or gesso. But this has all been scraped away under the unhappy ignorance that this too was merely whitewash. The exteriors had been left rough by the builders, all fitly and rightly enough, to suit the action of rough times and rough climates—but the interiors were to meet only the gentler action of men's thoughts and men's prayers. Roughness and refinement are both elements of sublimity in art, but they can never change places. What would give masculine grandeur to an exterior would mar all good effects within. The last touch given to the interior was to soften down the asperities of the rough materials. Coarse lines and broken joints of mortar confounded the finer forms of architecture. A thin film of fine cement resolved those discords and prepared the way for the colourist. But now-a-days colour, whitewash, gesso and all are gone. Architecture, first washed of its dirt, then deprived of its complexion, and, last of all, denuded of its very skin, is presented to us in a state of nudity, which we are then called on to admire! This ruthless process, besides its effect on countless minor buildings, has reduced the interiors even of some cathedrals to a condition of bare masonry and vaulting, comparable only to that of a common beer cellar—and, among others, has given the two grand shafts, which rise from the floor to the vaulting of the choir of Ely, the appearance of two huge piles of double Gloucester cheeses. These are but illustrations: they are, alas, too common.

That colour had its place in architectural effect, and that it was necessary to its perfection, has been a principle recognised in all times and countries, irrespective of climates, or even of conditions of civilization. I by no means insist that this should bind us to its adoption. The intelligence of one generation need never be a slave to that of another. But the fact of art having been unanimous in its greatest and purest age, whether of Pagan or of Christian times, on this subject, is a sufficient reason for our enquiry whether our preference for uncoloured objects is a purer taste, as some people are apt to arrogate to themselves, or whether it be not, as I believe it to be, a simple deficiency of perceptive powers, and the evidence of an elementary, inchoate and limited taste.

In the greatest days of classic and christian art, sculpture, as well as architecture, was coloured. In other words, the same spirit imbued those arts. The interiors of public buildings appear to have been most richly decorated. The fine sense of the Greek revolted against the blots of dead white with which uncoloured sculpture would have marred the unity of his architectural effects.

The objections urged by many persons against coloured sculpture appear to me to arise from two causes. One, and perhaps the main one, is this: that while possessed of a full amount of ocular perception of colours, and even a great love for them, they fail in their intellectual appreciation as things or qualities of purest poetry and great significance. Colour associated with form, to use their own words, interferes with the purity of abstract idea. It distracts their mind. They are imbued with a feeling of its sensuousness. They lay down, as a theory, that sculpture has one, and only one, element of excellence, the beauty of abstract form. It has indeed that element of perfection—but that is no argument that abstract form, to be beautiful, must necessarily be *dead white*. They appear to possess

the sensuous, and to want the intellectual capacity for colour, and to recognise in it, when combined with any art but that of picture, a quality inimical to the purity of idea. Is nature, then, so entire a type of sensuousness? Are flowers and shells, and a thousand other things, less pure than pieces of white stone? Have they no abstract beauty of pure form? Pure form is indeed most lovely, under any circumstances. Pure colour is most lovely too. In their combination two purities cannot produce impurity—but rather they help to make each other perfect.

The other cause of objection seems to me to lie in an exaggerated idea of colour, and in the conception of a realistic, low, material sentiment in its use, which is indeed the very opposite of what its advocates maintain. Colour in art is to make the beauty of all objects still more beautiful. It would not make them more beautiful if it made them less pure. Abstract beauty of form may be as great in any object, whether it be of one colour or of many. Colour rightly, purely, used, will never be a mockery. It will never be sufferable in pure art to use colour to make an object appear to be other than what it is. The quality of abstract beauty is the highest excellence of the highest art. It may be that statues have been painted to mimic flesh; but that moment pure colour was prostituted by such abuse. But why does a sculptor imitate the softest dimples of the flesh? Why does the modern sculptor prefer marble to all other materials, as in granulation and transparency most like flesh? I do not accuse him of a desire to deceive by those soft dimples or that translucent surface; but I claim for colour an equal freedom from intention to deceive. I claim for it the power to soften the softness of his marble dimples, to mellow the crudeness of his marble imitation of humanity, and to harmonise the surface of his work with the universal rule and use of nature. That is the use of colour purely and rightly employed in sculpture. That was the use of it in its best days. In archaic art, colour may have been violent and even vulgar; in the decline of art it was misused to imitation and voluptuousness. But in the highest days of art, when coloured sculpture was neither chargeable with the vulgarity of violence on the one side, nor the vulgarity of imitation on the other, the untinted statue was singled out for exceptional notice. The Venus of Cnidos is the common illustration of this. But the illustration merely goes to this, that the statue was not painted flesh colour. In the days of Praxiteles no completed work is mentioned with admiration for being left in raw marble. The well known circumlithio, or encaustic wash, was as universal for the softening of the crude marble surface as the varnishing an oil picture is now. Statues painted in mimicry of nature are certainly mentioned by Plato, and admired only as objects of rare ingenuity, not quoted as models of poetic art. But, irrespective of mere imitation, there was certainly no timidity of colouring, nor any squeamish value of mere materials. Wood, marble, and bronze were coloured and gilt in the best age of classic art. It has been suggested that the practice of polychrome in sculpture had its origin in the rich draperies with which the archaic wooden figures had been clothed. But it seems to me a degrading estimate of men's artistic sense, in the use of colour, to trace it thus. The great statues of ivory and gold could have had nothing in common with such an origin as that. We cannot tell whence any taste may have been derived; but when a nation, so highly endowed with artistic perceptions as the Greeks, could rarely, if ever, tolerate a colourless thing, whether in sculpture or in architecture, it is an indignity to attribute their use of colour to habit or tradition, or to trace the chryselephantine work of Phideas to the barbarous draperies of archaic gods.

The art of the statue painter was as distinct from all others as that of the landscape painter, or miniature or figure painter, is now. We have the strongest reasons to infer that sculpture, in connexion with architecture, was rarely, if ever, white. The mere encaustic of Punic wax and oil mellowed the crudeness of its tint. The works of the greatest sculptures in various marbles, in bronze, in ebony, in ivory and gold, with painted draperies and golden hair, with parcel gilt ornament and inlaid silver,

must induce the belief and warrant the opinion that in those days of art's greatest creative genius, in those days of the intensest perception of the abstract beauty of form in sculpture, colour was recognized as an element of excellence to make that beauty perfect.

In the painted architecture of Christendom, sculpture was not, as in classic art, a principal, but an accessory. In Gothic work, therefore, statue painting, although often most refined in colour and in ornament, seldom rose above the art of architectural decoration.

The polychrome of the ancients was as contemporaneous with the architecture as the circumstances of each case allowed. The uncoloured temple or public building was mentioned as being as exceptional as the uncoloured statue. A well known case is that of the Prytaneum and the Agora of Syphnos, which Herodotus mentions as white-fronted, in a manner implying their newness and unfinished condition at a critical juncture of their history.

We have reasons to infer by the descriptions of ancient writers, and to know by existing examples, that the polychrome of sculpture was supported not only by the rich colours of the interior walls, but also by furniture of marble and inlaid metals, ornaments and vases of terra cotta, inlaid pictures and mosaics, and more richly still with the costly beauties of rich embroidery. There was no cowardice, no quakerism of so called "quiet" colouring in those days. Imagine what such a statue as that of the Minerva of the Parthenon, or still more the Jupiter of Olympia, would have appeared with its many coloured materials, with ivory for its flesh, and that too probably enhanced, as the ancient fashion was, with encaustic tinting, with gold for its enrichment, and its drapery diapered in painted colours of fruit and flowers; imagine such a figure, perfected by all that art could concentrate upon a single idea, by form and colour, ideality and realism of the highest and rarest, seated in a modern public hall, of which, as is most common, the colours of its walls alternate with tints of putty and of mud, picked out with a modest dilution of raspberry cream. But I am not to be supposed to be advocating violence of colour because I advocate power in its use.

In such magnificent beauty as in the works of Phidias, in their full glory of polychrome, natural and artificial, we do not hear regrets of the great sculptor himself, or complaints of his contemporaries, that colour interfered with the beauty of their form. In their days was realised that power of artistic combination by which colour could be felt as pure and beautiful in art as it was in a rainbow. In those days the grandeur and the beauty of form, as represented by the highest ideal of architecture and of sculpture, could be and was recognised no more in the Venus of Cnidos than in the Minerva of the Parthenon; no more in the white shafts and cornices of Syphnos than in the coloured glories of Athens, Elis, and Ægina. No, in those days, to which we turn with reverence for the classic education of art as for the classic education of its literature, we hear nothing of that bald idea, which seems to me to imply either poverty of sense or poverty of imagination, that the ideal of the purity of abstract form is marred if it be clothed in colour. The ideal of form is indeed most pure and lovely; but I am convinced that, as in ancient days, so too in our own, a larger hearted, and not less pure minded perception of its excellence will find no hindrance in its association with the excellency of ideal colour, but rather will love the loveliness of colour which only makes the ideal form more lovely still, as it has nature for its universal guide, and human sympathies for its universal exponent.

If ever there were a science, if ever an art of which the whole sentiment was expressed in that of the ideal of abstract beauty, it is architecture. In its every feature it is a human invention. Its forms, indeed, are consonant with those of natural beauty—its powers are in conformity with those of natural laws—but in its own completeness it is a pure and original conception of beauty which is nowhere found in the realms of nature. It exists only as the embodiment of a great and beautiful idea.

The excellency of all fine art lies in its ideality. Sculpture inclines to arrogate to itself too exclu-

sively the highest ideal of form in its purely abstract sense—but most beautiful, most inexhaustible as its resources are, it must rely for the power of its effects, not so much on abstract beauty, of which the world in general can rarely realise the idea, but on human reality, human sympathy, embodied in the beauty of human form, which it is the province of sculpture to accentuate and express. For abstract beauty, therefore, architecture stands the first. To amplify the ideal of its beauty it has long since modulated all other arts within itself, the arts of form, of colour and design, the arts of technic mechanism, and æsthetic poetry.

A serious question in the revival of architectural painting is the revival of its ancient styles.

The argument that such revival would be only retrogression must, in consistency, forbid recurrence to the very styles of architecture itself, no less than to the styles of its decoration.

If progress is to be based on the step last gained, the genius of our arts must take wing from the tower of the Crystal Palace, or the floor of last year's Exhibition. I find no fault with the Palace or the Exhibition, but I see no hope for the architectural art of the future but in the revival of all that excellence of the arts of past times, which, from whatever cause it may be, has been allowed to die,—revival, I say, not of mere copyism, not of indiscriminating repetition, not such as some mere sentiment would suggest, or some limited favoritism would dote upon—but, with the larger hearted purpose, to find a base from which our arts might rise, with the firm footing of definite principle.

I believe that we do find such definite principle in the arts of past times. Our arts, on the contrary, are now a very republic of antagonisms. They have thereby lost dignity through self-contradiction. It is in the spirit of discipline that any great school of art can have its spring. Men may differ in opinion, for we have but little contemporaneous record, how great schools of art have arisen. But, whether it was by accident, by intuition or by principle, I care not now to argue, but the result was most assuredly this, that in the earlier styles, both classic and christian, is found the production of magnificence in architectural effect by the union of arts, which was lost by the development of their independence.

It is to such a disciplined union as that, that the architecture of the future had best rely.

A definite style, no matter of what age, was the expression of a definite idea; that style was perfected by the union of many arts. The more perfect their union, the more perfect the expression of that idea. Destroy that union, and you destroy the very means of its expression. The whole charm of style lay in the purity and clearness of its voice. The charm of all styles lay in their clear expression of individual character. It is to indifference or to want of power to recognise this, that the failure of so much in modern art is attributable. The trumpet gives an uncertain sound, and all its music is gone.

If, then, I argue for a revival of ancient systems in their completeness, Pagan or Christian, Classic or Gothic, it is in no spirit of sacrifice to mere antiquarian technicality. But indeed far otherwise. I believe that the genius of original invention will thus have increasing scope and increasing resources. We find in the styles of other days so many modes for the expression of human sentiments.

The catena of styles is the golden chain of human sympathies.

There is a sacredness in their history, and a sacredness in their associations. These are no trifling qualities which make them worthy of our adoption. I argue, therefore, that in our dealings with the works of our predecessors we have a definite duty to them no less than to ourselves. Style must not be in bondage to technicality. In adopting any style it is the spirit of it rather than the letter for us to master. And if art be eternal, as I believe it to be, those styles of the Pagan and of the Christian world may still be used in their separate and complete entirety to let loose and to embody our thoughts—for they were OUR fellow men who first conceived them, and we are THEIR fellow men who need to use them, in a communion of reverence for those who have gone before, and in a communion of interest in those who are to follow us.

When the painter and the architect first worked together the spirit of the age which brought their arts into life and action inspired them alike. It has been common among art-critics to regard rather with a compassionate admiration that union of spirit which kept those arts in harmony. In the account taken of Pagan and Christian arts, that period is regarded as that of their weakness or their infancy. The full dignity of manhood has been accorded to them only when they had arrived at a direct and positive antagonism—when, for instance, painting worked for its own glorification—when it took a space assigned to it by the architect, and turned that space into a lie,—when it turned the surface of strong walls into scenes of atmospheric perspective, or a cupola into a region of clouds. I urge that this was and is a miserable abuse of art—I believe that this abuse lies in a misappreciation of the vastness and elasticity of art. It comes of conceit, and the self glorification of one art in abnegation of the purposes of another. I speak not now of painting merely for its decorative effects, but of the highest sphere of that art, its historic, sacred and poetic expression in alliance with architectural design. I must express regret at the paucity of ideas, not only in our own day, but even in the greatest days of artist life by which one exclusive phase of the painter's art has been recognised as perfect,—that of pictorial effect. I believe the greatness of that art rather to consist in the greatness of its adaptability—in its power to respond to the most opposite demands. But now it is restricted to one only phase—that one only is supposed compatible or proper to its highest aims—that whether that grand art be applied within the limits of a gold frame, or be spread over some great surface, needed for the repose and grandeur of architectural effect, yet still that the same ever repeated phase of "*picture*" should prevail. It is strange that artists should not see the excessive weakness of this poor restriction of their art—that whether it be applied to a picture in a boudoir, to the bulging side of a jug, to the bottom of a dish, or to the great wall spaces of architectural design, their grand art should manifest such poverty of invention, such wretched weakness of resource, that under conditions so opposite it should still remain the same.

But the modern painter has made himself a slave to the technicalities of perspective. The greatness of his art lies in *design*, not in the mere technicalities of linear or atmospheric relief. But art was in this way narrowed centuries ago, even by those who in its great days glorified it by their genius—but they were intent on one ideal of it alone—so they dammed up its stream and made its channel narrow. Painting was reduced to pictorial effect. Arts once glorious in their diversity were all drawn in, within one narrow code of academic rules. The altar-piece, the window and the wall (as I have said elsewhere) were all brought within the category of the same rigid table of art laws. Glass, pottery, walls, pictures, mosaics, were all to be treated alike—and why? because the artists were in bondage.

Academies had ignored the varying conditions of art in its place, its purpose and its materials; and popular opinion, lending its nose to the hook of academic pretension, had frightened the artist into compliance, for his health, his peace and his pocket, but not for his conscience sake.

To the honour of English art there have been two great spirits who broke loose from the track of common place, and asserted in practice the true theory of design, both in decorative and in the highest order of illustrative art—that design is best which is best fitted to its place, its purpose, and its material. Their names will ever be sacred in the annals of English art—I mean those of Wedgwood and of Flaxman.

In the history of architectural art as written in the remnants of its monuments, we find most interesting illustrations of its union with that of painting. We find that everywhere when these arts have combined without mutual injury, a system (even if it be not dignified as a principle, which I believe it to have been)—a system was ever most implicitly followed. I say—whenever those arts were combined without mutual injury. In Egypt, in Greece, in the classic South, and in the Gothic North of

Europe this system prevailed. It may be that in those days of the accord of arts, the technicality of the painters was not equal to their feeling—that their heart was beyond their art. It may be that such men as Polygnotus and Pancenus at Athens, contemporary with Ictinus and Phideas, or the Gothic painters in France and England, contemporary with our Edward the Third, may have been surpassed in the technicalities of design and of relief by those who followed them; but, be this as it may, they worked with architecture without stultifying it.

Their accomplished followers ignored the art with which they pretended to work, and used the forms and mouldings of architecture as mere picture frames.

The walls of Egypt and Pompeii, the traditions of Greek art preserved by Pliny and Pausanias, the vases and the tombs of Etruria, the paintings of the catacombs, the mosaics of early christian art, and the frescos and other wall paintings of its development, present to us a system and a sense of art in one continuous stream of common feeling—painting allied to architecture in harmony and completeness. Painting is an art of exceedingly wide range—from the bold symbolic outlines of an Egyptian hieroglyph to the niggling mimicry of a Dutch picture—and wide in the purposes it is capable of fulfilling—such as for walls or pottery, for pictures or enamels, for sculpture, architecture, glass or tapestry. This versatility needs to be realised before its use can be mastered, or its criticism worthy of regard. I am advocating no necessary return to archaism—certainly no return to any imperfect type—and less still to any abnegation of our own knowledge and art-powers, whatever they may be. But I certainly do advocate the study of painting in a far wider sense of its powers than is commonly found among us now. I look to it to harmonise itself with whatever it may be associated, whatever be its style—I look to that union of the arts rather as their espousal than their vassalage. If in architectural painting the art were denied some of its common resources, it would be but to draw out and elevate the rest. Design need lose nothing of dramatic expression—figures need lose nothing of their vigour; art would rather gain by it than lose. Pictorial effects and accessories are only too often the means of escape from some crucial difficulty of composition. But where these find no place, and all resource for artistic indolence, or cover for inability is cut away, a painter is put upon his mettle—his design must be more matured, his composition more studied, and his work thus necessarily raised to a higher standard. It would be no ill day for our arts, if there were anything thus pressing upon them to force them upward.

People err in taste because they ignore the proper base of criticism. They are confounded by the flood of heterogeneous forms which disgrace the character of modern art; and no wonder; but once seize the guiding star of all judgment—once realise the condition in which a work is placed, conditions as to itself, conditions as to its place, purpose and materials, and then all is clear. No matter how much consecrated by long use or common associations, it must be condemned if its conditions be unfulfilled.

But to conclude—Monumental art is of all others the highest in its aim. Its condition of success is that the resources of all arts be brought into unison. The success of former ages is the result of that unison, in which the whole chorus of the arts joined. It is the modern self assertion of the individual that renders success in monumental art well nigh impossible. Let each art be free as air, and revel in its own powers when it is alone and uncontrolled; but then, and only then.

The painter's triumph may be complete. Let him paint as the spirit moves him, and do all that natural scene, or historic incident can inspire. But then, associate his art in full swing of its liberty with the calmer dignity of architectural design, and the result is this—both mind and eye are offended, he has made all light which the architect had purposely left massive, bold and broad; he has placed the two arts in direct antagonism, he has stultified the architecture, and reversed every condition of its

equilibrium, opening that which should be closed, lightening that which should be heavy, leaving weighty masses of masonry without apparent support. He has turned heavy walls into thin air, and has left massive arches to carry the clouds.

But the great works of other times have given us the precedents and principles to attain results of success similar to their own. Surely it will not be denied that if ever taste culminated to its highest act, it was in the creation of beautiful works. If ever there was authority in taste which we are bound to reverence, it was when art had attained its greatest triumphs. Individual taste may now-a-days rebel, in vanity and self assertion, but great artists of the greatest days did otherwise. I am confident that in conjunction with architecture all arts are raised at once to their highest sphere. Architecture is the most conventional of all arts, the creature of thought most abstract and refined; and with it others can find companionship complete and sympathetic only in their purest and noblest character, where all power is concentrated to symbolise and suggest rather than to realise, to address imagination rather to satisfy curiosity. Naturalism and imitation are other distinct and inferior phases both of sculpture and painting—phases indeed to which a good pupil must attain—to which the master must have himself in his pupilage attained, to reach his higher standing ground. They are steps, mere steps, which all must mount who care to feel the pure air above, and to see the broad horizon of art's poetry in all its beauty.

I conclude therefore with this—that if those various arts of which my subject has treated could be attained, and their spirit guided by the genius of one master mind—if their full powers could be compelled, and their resources welded together with unity of purpose and unity of result; such a conclave of the arts could *only* meet for one great triumph—in an architecture completely beautiful—the mother and the mistress of them all.

Mr. JAMES FERGUSSON, Fellow, (responding to the President's invitation), said he should be most happy to move a vote of thanks to Mr. Gambier Parry, for he had never listened to a lecture in that room with more pleasure; but he felt unable to add a word to what had fallen from that gentleman. He agreed with almost all he had said, and if he fancied he differed in some small respect from some of his remarks, he felt he was not justified in expressing his views without seriously thinking over those points. Mr. Gambier Parry had said so much that was beautiful, original, and good, that he (Mr. Fergusson) must be content with moving a vote of thanks, and saying no more for the present.

PROFESSOR DONALDSON, Past President, begged to second the vote of thanks which had been moved by his friend Mr. Fergusson. He owned that he heard with pleasure a voice in those rooms reaffirming the principle which was advocated twenty years ago,—that polychromy, as an art, was one of the elements of nobility in architecture; that colouring of sculpture was legitimate and prevailed to a great degree among the ancients: in fact, that it was applied to every object that formed part of the composition of Greek buildings, whether temples, palaces, or private houses. There was one observation amongst others in the able paper of Mr. Gambier Parry which he did not apprehend fully, and he would be glad if that gentleman would do him the favour of explaining precisely what he meant by the remark that when colour was applied to statues it was not applied to imitate the flesh. It appeared to him that if colour were to be applied to a statue it was for the imitation of flesh, because it was done for the purpose of presenting to the eye the object which was intended to be represented in its greatest fulness of expression and sentiment; and he believed statues, with certain reserve, coloured and painted to imitate flesh, would have much greater effect upon the mind of the beholder than the severe white marble. He agreed entirely with his friend Mr. Gibson, the eminent sculptor, who introduced colour, to a limited extent, however, in his statues. He had reproached him that he did not go far enough with it.

When the eyes of a figure were coloured, and a little gold was put here, and a little tinting there, it was not carrying out polychromy as the ancients did. To give full development of harmony, in all its power, it was necessary that the whole statue should be coloured, so that one part might be in perfect accord with the rest. It was in no captious spirit, but in order to show Mr. Gambier Parry that he had not been an inattentive listener to his learned discourse, that he ventured to submit to him this question, and he should be glad to hear from him whether he rightly understood him to state, that the objection to colouring of statues was, that it would be too sensuous if it represented actually the flesh?

Mr. M. DIGBY WYATT, Fellow, remarked that when a gentleman of Mr. Fergusson's position and attainments had shown his disinclination to enter upon this difficult subject by the very short compass in which he had proposed the vote of thanks for so eloquent a discourse, he (Mr. Digby Wyatt) felt it was very like presumption on his part to enlarge upon the theme; but as discussions amongst them ought to be frankly sustained; and as it might be expected that those who, like himself, had thought much on this subject should give an indication of the conclusions to which their thoughts had tended, whether agreeing with, or differing from those of the lecturer, he might be justified in saying a very few words. He, for instance, had felt strongly that one important term which Mr. Gambier Parry had used throughout his admirable address pointed not only to what should be an essential characteristic of all producers of perfection of colour, but to the mainspring of all those conventions and imitations in art which must unite with colour to occasion truly harmonious results. That term was "discipline." The undisciplined artist broke out in exaggeration and vulgarity as the undisciplined picture invariably failed in harmony, keeping, and repose. It was necessary for every true painter to subdue himself, modulating his designs to the special conditions of alliance under which he might have to work, and in the application of his art to architecture to content himself with fusing, as it were, his own individuality in the general result aimed at, to the abandonment of all turbulent self-assertion. Before any perfect result of union in the arts could be obtained, it was necessary that men should study to that special end: they must no less clearly recognise what they must subdue in themselves, than what they must yield the place of honour to in others. In the attempt to revive historical styles, in which painting and architecture had been successfully associated, the student who worked at the reproduction of the material form in which the best ancient masters had worked would of course go astray. When results in revival were successful, it was almost always the case that those by whom they were produced had followed, not in imitation, but by analogy. It was, he thought, by observing the points which seemed antagonistic in various styles, rather than those which appeared to be in accord, that the students would arrive at the true essence of each, and so create for himself, as it were, the atmosphere in which he would best succeed. For instance, any one who laid himself out specially for the observance of the harmonies incident to mediæval design at various periods, with a view to their successful reproduction under altered conditions, either of time or place, would in such case acquire great additional mastery over the grammar of form characteristic of those periods, if he closely investigated the conditions under which effects of beauty, or the reverse, had been achieved by apparently contrasting or relatively antagonistic means in classical architecture, and the styles deriving therefrom. He should certainly observe by what means successful results were obtained in most, if not all, styles, and how respectively the Greek or Goth of old would have produced the effect at which he might find himself aiming. Real success was best ensured, not by opposing, ignoring, or servilely reproducing styles of the past, but by concealing or avoiding carefully all their deficiencies, and adding features consonant with every modern requirement. Speaking for the moment hastily as to the history of art, and without noting rare exceptions, it appeared to him that the painter had in his own branch gone widely astray the moment he had separated himself from the architect. So long as the architects provided, and the painters worked upon, walls and other

mural surfaces, and worked together, they were both mainly successful; but as soon as they separated they both went astray; because the painter lost the habit of working in that grand style, and on that large scale of dramatic simplicity which architecture demanded; while the architect lost the aid of a previously all-essential auxiliary. In easel pictures painting too often degenerated into mere furniture; and had done so from the days of Raffaele even to the present time. It was curious to notice the different tendency in the performances of the coteremporaries and immediate followers of that great master of the union of the arts. His master Perugino, and the senior pupil in Perugino's studio, Pinturicchio, were accomplished masters in mural painting, and from them no doubt Raffaele had learnt, both at Perugia and Sienna, to wed painting to architecture after the mingled traditions of the Gothic or Giottesque school, and those of the classical or Paduan. Among Raffaele's scholars the strangest contrasts presented themselves; none, for instance, could be greater than between Giulio Romano, that father of sensual mischief, and the tender-thoughted Perino del Vaga. They both worked almost from the same cradle, yet one burst into self-assertion, and the other laboured all his life in ascertaining the conditions to which all his numerous designs for decoration had to be applied, and in cultivating his talents those steps of moderation and self-discipline by which harmony was alone to be obtained. The recollection of the characteristics of many of the elegant designs made for the Dorias and others by Perino del Vaga brought to Mr. Wyatt's mind another illustrious name which Mr. Gambier Parry had excluded from the society of that illustrious pair of British worthies to which he had alluded. To the names of Wedgwood and Flaxman might, he thought, be added with propriety that of Stothard. The last named and Flaxman thoroughly apprehended the laws of beauty with relation to the practice of decoration and the principles of composition applicable to all the media through which art could find its way most readily to the hearts of the people; and it was a great thing for England to have had men, at a time when most others were either ignorant of, or indifferent to the value of the past in art (especially in mediæval art), so keenly alive to the beauties which ancient mural decorations, in this country, as well as in Italy, no doubt did once manifest. But few examples of such ancient decorative art were left in this country for the student to admire. In the Chapel of St. Stephen, Westminster, at Chichester, Salisbury, Canterbury, Durham, Ely, Norwich, &c., a few fragments might still be traced, but unfortunately they gave but little indication of what ancient painting in England had been. Still, in the pages of the illuminators they had clear evidence that the English painter was an accomplished artist at least during the thirteenth and fourteenth centuries. Though many ancient works of art had been ruthlessly covered over and destroyed, sufficient had been brought to light and preserved to vindicate his claim to a distinguished position in the art of applying colour to architecture; and Mr. Wyatt hoped on some future day that his position in that respect historically might be vindicated to a greater extent by some such able master of the subject as Mr. Gambier Parry had proved himself. Mr. Wyatt certainly felt obliged to that gentleman for the admirable liberality with which he had treated his subject that evening. He could not but feel, that for one who had devoted himself mainly to the study of mediæval art, and who, by beautiful design and great hand dexterity in the production of works of mural painting on the grandest scale, had manifested his command over the principles and practice of that special phase of painting, to express himself with the catholicity and justice which had marked all that Mr. Gambier Parry had laid down for them that evening, was truly admirable.

PROFESSOR KERR, Fellow, wished to express his admiration of the graceful and gentlemanly manner in which Mr. Gambier Parry had addressed his observations to the Institute. He regarded him as what might be called a model amateur, for he came before them as one who was himself an artist, who devoted himself personally to art-labour, and he confined himself strictly to that art to which he belonged. At the same time one might perhaps venture, if not to differ from him in some of his

doctrines, at least to raise the question of his differing from public opinion upon those points. Mr. Gambier Parry seemed to hold the doctrine that sculpture ought as a fundamental rule to be painted. That this doctrine was supported in some degree by the works of the great masters of the early Greeks may be acknowledged; but he (Professor Kerr) must still confess himself to be one of those who could not agree with the painting of sculpture as a rule. He considered that colour, as regarded that particular class of subjects, ought to be confined to the art of painting on the flat; and that directly the artist professed to imitate nature in the solid—directly he departed from the mere delineation of objects in perspective—he went into art of a different type, and ought altogether to surrender colour, so far as representation of nature went. He might suggest further, that there were only two kinds of sculpture as regarded the question of colour,—one which might be coloured in direct imitation of nature, like wax-work, and the other, that which contented itself with the real material in which it was executed, or some equivalent. The highest class of sculpture, in his opinion, must ignore colour altogether, and depend for the exhibition of texture, expression, and sentiment entirely upon the work of the chisel. This, he thought, was the ordinary idea of sculptural art. He might be allowed next to make a suggestion on a practical point. He was much interested in hearing what Mr. Gambier Parry had said with regard to the materials which should be used in fresco-painting. It struck him that the range of fresco-painting might be considerably enlarged—it was a suggestion more theoretical than otherwise—if the use of lime for the surface were modified. It had always appeared to him that for the plaster upon which the painting was to be put, lime ought to be used in the smallest possible proportion. It also appeared to him that sand ought not to be used at all, because it was obviously quite unabsorbent of colour. Then if they used pure lime itself, they used a material which limited the range of colours. But if they would employ the smallest possible proportion of lime mixed with very finely powdered white stone dust, they would have a material not less white than the pure lime and as perfectly absorbent of colour. If Mr. Gambier Parry had not tried this, he would suggest the expediency of his doing so, to see what came of it. The greater the range of colour allowed the better; and he had always thought that if fresco-painting could be brought into some form which would admit of its being used to a greater extent than at present, it was one way in which the country might improve its volume of art very largely.

Mr. JOHN W. PAPWORTH, Fellow, said that, having been twice permitted to read papers upon colour in that room, he might be expected to make some observations upon the lecture of the evening. Excepting points of æsthetical and technical character, with particular views of the history of art, which would require a longer discussion than the end of an evening would allow, and which really did not much influence the principles advocated, he saw that the paper was a field for agreement between the lecturer and himself. Many of the differences of opinion which had existed on the question of the ancient and modern employment of colour might have been caused by meanings given to the word "painting." The careful reasoning which had been exercised in the production of that paper was evidenced in the attempt to divorce *architectural painting* from *pictorial art*: and he hoped that the audience had appreciated the distinction between them made by Mr. Gambier Parry. It was one in which opposite schools of critics could join without shame at having to take so excellent a lesson from the lecture, in which it had been propounded for the first time, or at any rate for the first time with so much power. One of their difficulties had always been to reconcile the demands of *pictorial art* with the claim of architecture (if she were considered to be capable of form and thought) to be freed from alliance with *that* painting which turned her into a mere frame. The evil results of such union were visible in the salons at Versailles; but the practical remedy had not hitherto been suggested. With regard to the application of colour to sculpture, the lecturer seemed to have taken care to avoid any

support of an attempt to imitate nature by means of similarity : a care that should be heartily approved by any one who, like he did himself, held that nothing, in painting or in sculpture, which tended to a deceptive reproduction of nature was good. That criticism condemned absolutely the practice of applying colour in architecture by putting local or other natural colours to ornament, as well as the practice of applying colour in sculpture by putting figures, in red coats, with yellow vests and brown breeches, before a background of green trees, blue skies, and white clouds, having a little brown under them to sham their shaded side more completely.

Mr. THOMAS MORRIS, Associate, desired to introduce one word, that had not, as yet, fallen from any speaker ; and it was a conciliatory word, since, should opinion happen to vary upon any part of the admirable lecture, it would not, he thought, upon this—every architectural work should possess the quality of *tone*. The architect would deem this quality more essential than colour, for, by its presence only, could his compositions exhibit the harmony of result Mr. Gambier Parry advocated. It was certainly more necessary to the effect of a building, that there should be evenness of tone—a oneness of chromatic purpose, simply fulfilled—than that there should be any positive display of adventitious colour. Still, allowing that to be as it may, and let the windows (the channel and key of internal light) throw tinted rays upon plain surfaces, or pure light upon tinted objects—admitting polychromy, broad shades, and materials with native colour, deep voids and prominent solids—there was yet, amid all this variety, one aim to be constantly promoted, namely, a consistent, prevailing and concordant tone. Here, the architect was really the painter, though working, it may be, with his mind, rather than with the brush.

Mr. WILLIAM WHITE, Fellow, would say one or two words on this subject. Having had occasion to differ from Mr. Digby Wyatt upon another point, to which he should probably refer at some future time, he was the more glad to endorse fully what had just fallen from him with reference to the necessity of system and principle in carrying out architecture in all its branches. For without doubt the elaboration of a proper principle would afford a crutch to the lame, and so far from cramping invention it would furnish wings wherewith the genius might soar. As to what Mr. Gambier Parry had said on the subject of architectural painting in general, he strongly felt that so long as painting was used for the enhancing of form, and bringing out of architectural outline, that was its true aim, but if used as a mere decoration to an architectural form which lacked spirit and character in itself, it must essentially fail ; and he was personally very much obliged to Mr. Gambier Parry for having brought that principle so prominently before them. As regarded the painting of sculpture, he would be sorry to anticipate the lecturer's explanation of the point adverted to by Professor Donaldson, but he (Mr. White) understood the proper painting of sculpture to consist simply in the colouring of it, in order to add tone and texture to the sculpture, and to harmonize it with the rest of the work, and not for the sake of making it an imitative or pictorial representation.

Mr. F. C. PENROSE, Fellow, was glad to have the opportunity of tendering his thanks to Mr. Gambier Parry for his very valuable discourse. He had never heard the points which they should all aim at in the union of the arts so clearly put. It was the key for their future progress, if they could only keep to it. At the same time he must remark that the discipline which they had been called upon so earnestly to accept, and which he hoped they would endeavour to put upon themselves, must be impressed upon painters and sculptors also. He feared they would be difficult to treat with, but the task should not be given up on that account. He thought Mr. Papworth had truly stated the difficulty of agreement in the matter of the colouring of sculpture by the ancients ; namely, that it proceeded from the want of recognition of the real thing done. If, therefore, we were able to contemplate Phidias' great work in the Parthenon, he felt sure we should all be perfectly satisfied with it, however

of flesh in a piece of sculpture, he had endeavoured to show that that imitation of flesh had not the intention to deceive them that it was flesh. The dimples were so soft that they were delightful to look at, and the texture was beautiful because it was marble; and if anything were put upon it, it could only be to perfect it as a work of art. The art-science of architecture was the science of casting shadows: the beauty of all effect depended upon the forms and amount of the shadows that were cast. The use of colour deepened and softened the whole work, and gave it the character of consummate art. It was the same in sculpture. That which would be crude in the raw material was made lovely and soft because it was tinted into beauty. If he spoke of painting in sculpture it was not to be supposed that he spoke of it as giving it the flush of life to mimic life, but merely that which rescued it from the repulsive deadness of crude white marble. But some one has well written, that "if the flesh is thus softened by colour the drapery must be enriched by the use of effective colour, otherwise the flesh would look dirty." That was the way in which the architectural colouring was used in the remains of Cyrene. There was a remarkable use of colour. It was that in which the general bulk of the architecture was softened into gently tinted forms, and upon and around them were used bands of sharp and positive colours.

The vote of thanks to Mr. Gambier Parry having been carried by acclamation, the meeting adjourned.

Royal Institute of British Architects.

9, Conduit Street, Hanover Square. W.

12th February, 1866.

VOLUNTARY ARCHITECTURAL EXAMINATION, 1866.

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| EXAMINERS - - | ARTHUR ASHPITEL, F.S.A. | } Fellows. |
|               | EDWIN NASH. - - - -     |            |
|               | JOHN W. PAPWORTH. -     |            |

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|--------------|------------------------|------------|
| MODERATORS - | CHARLES FOWLER, Jun. - | } Fellows. |
|              | T. ROGER SMITH. - -    |            |

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LIST OF CANDIDATES WHO HAVE PASSED THE EXAMINATION, (ALPHABETICALLY ARRANGED).

CLASS OF DISTINCTION.

WATSON, THOMAS HENRY (Associate R.I.B.A.) 9, Nottingham Place, Marylebone Road, W.
(*Passed in the Class of Proficiency—year 1863.*)

CLASS OF PROFICIENCY.

EDMESTON, JAMES STANNING 5, Crown Court, Old Broad Street, E.C.

HUNT, FREDERICK (Temporary Student R.I.B.A.) 17, Upper Belgrave Place, S.W.

WILKINSON, R. STARK (Temporary Student R.I.B.A.), South Penge Park, S.E.

WONNACOTT, THOMAS West Street, Farnham, Surrey.

JOHN P. SEDDON,	} <i>Honorary</i>
CHARLES FORSTER HAYWARD,		} Secretaries.

At the Ordinary General Meeting of the Royal Institute of British Architects, held
on 12th February, 1866,

G. E. STREET, Fellow, V.P., in the Chair,

The Honorary Secretary reported the results of the VOLUNTARY
ARCHITECTURAL EXAMINATION, and read the following—

REPORT OF THE EXAMINERS.

9, Conduit Street, 9th February, 1866.

*To the Honorary Secretaries of the
Royal Institute of British Architects.*

GENTLEMEN,

Having concluded our examination of the several drawings and other papers submitted to us by the Moderators, we have now the pleasure of reporting the result of our labours.

We have arranged in a tabulated form the number of marks assigned by us to each of the distinctive letters affixed by the Moderators to the said papers, and these marks will be so re-arranged by you, according to the said distinctive signs, that the total number appertaining to each individual candidate may be ascertained, and known by yourselves only.

As by the system prescribed in the Regulations we cannot know to whom the distinctive signs apply, we cannot be sure that every candidate in the Class of Proficiency has gained the number of marks necessary for passing: but, should there be any failure in this respect, we consider it would be an act of kindness for yourselves (without entering into detail as to the precise number of marks obtained), to be authorized to communicate confidentially, to any gentleman who may not pass, the particular section in which on a future occasion he should be better prepared.

Inasmuch as there was only one candidate in the Class of Distinction, we are aware that he has gained more than the number of marks requisite for success, and in conformity with the spirit of the Regulations we hand to you only a total of the number assigned to him, but we shall be happy to furnish the details if they should be required by the Council.

It will be evident that the method we adopted, namely, the examination and valuation of the papers, first separately by each Examiner at his residence, and then conjointly for the sake of agreement of opinion, must be more to be desired by the candidates as a measure of justice, than one simultaneous examination continued by as many adjournments as the professional engagements of each of the Examiners might demand. The pressure upon the Examiners has been considerable, and we have had some difficulty in maturing our examination and agreeing to our Report within the prescribed period, and we trust that in future a longer time will be allowed.

It gives us extreme pleasure to notice the earnest and conscientious manner in which the candidates have prepared themselves for the present occasion, and have produced a character of work which could not have been expected from those who took the brunt of the first or second years of this important experiment: and to the honour of those who may have passed this year, it may be

Some inconvenience has resulted from the fact that the form of "Schedule of objects submitted as preliminary work," included in the revised Regulations, was not printed separately, and issued for use as has been done with the form of Applications and Recommendation. We recommend that this should be done, as trouble and loss of time would be prevented, and the intentions of the Institute with regard to preliminary work would be more fully understood, and probably more rigidly observed than has been hitherto the case.

The examination was held this year in the Library of the Institute. This is a convenient and fairly well lighted room, but liable to interruptions owing to its being necessary that books should be fetched by the librarian when called for. This room also would not accommodate a large number of candidates. It appears to us desirable that in future years the possibility of obtaining the lower gallery should always be secured in case it be wanted. We mention this because that gallery appears to be now let, so that had the number of candidates been large, we should have been placed in some difficulty.

The same perfect good order, punctuality and diligence which have been observed by the candidates on both former examinations have again been conspicuous.

We have the honour to be, dear Sirs,

Your faithful Servants,

CHARLES FOWLER, JUN. }
T. ROGER SMITH. } Moderators.

9, Conduit Street, W., January 31st, 1866.

Mr. C. F. HAYWARD, Hon. Sec., after reading the foregoing Reports, and giving names of the candidates who had passed (as on the first page), went on to remark that, comparing the papers with the marks, he had to state that all the candidates had passed the Examination, and that all had obtained marks considerably beyond the number necessary to pass. The lowest candidate had obtained above one-third more, and the highest fully two-thirds more than actually required. This result of the Examinations had been highly satisfactory, especially when it was supposed by some at the early part of last year that the Examination was likely to be too severe, and that the young men would not be able to pass. In the earlier ones, it will be recollected, there was a provision in the Regulations for an allowance of a certain number of marks in order to make the Examinations more lenient, but in the present instance the full number had been required and all the candidates gained, as had been stated, far more than actually necessary.

Mr. EDWIN NASH, Fellow (one of the Examiners), having expressed his deep regret at the absence of Mr. Ashpitel, said he had gone through the papers with the greatest pleasure and surprise at finding how well the questions had been answered. In the class of distinction the answers were remarkably excellent in nearly all the departments, there being two subjects only in which it could be considered the candidate was not up to the mark—one being a subject of importance, and the other not so. With regard to the other four candidates, two of them—and especially one—acquitted themselves particularly well; so much so that he thought one of them would have been likely to have passed in the class of distinction had he put himself forward for that class. Inasmuch as the Council had given the Examiners power to consult certain professors, and men eminent in matters of architecture, with regard to a supplemental report upon any changes that might be desirable, it was not necessary for him to go into detail now. He would, however, observe, speaking for himself, that these Examinations were, he knew, liable to a little misconception on the part of many members of the

profession, and it seemed to him the mistake lay in imagining that the Examinations were intended to shew that the parties examined were above that which other members of the profession ought to be. That was not his own view of the matter. The Examinations were intended as the test of the possession of that substratum of knowledge which all ought to possess. They might say a man passed in the class of distinction, but it was not intended by that to convey that he was such a distinguished man that others had no such attainments; but only that he possesses a high standard of knowledge and skill, and, viewed in that way, he thought the Examinations must be regarded as valuable, and a good guarantee that those who passed would not disgrace their profession when they come to practise it.

Mr. JOHN W. PAPWORTH, Fellow (another of the Examiners), was very sorry that Mr. Ashpitel, unfortunately from a fresh attack of his serious complaint, had been prevented from attending this evening, for he was certain that that gentleman would very much regret not being present, from the exceeding interest which he felt in the Examinations, shown in the attention which he gave to setting the questions, and to considering the answers. The Examiners had expressed in their Report, and the Moderators in their Report, the views they entertained upon the subject of the present Examination; and it would therefore be unnecessary for him to go over the same ground; but there were one or two points which he would be glad to bring prominently before the meeting, on the part of Mr. Ashpitel. One of these was the superior quality of the work done in this year, in comparison with that on the two previous occasions: this merit perhaps appeared because in the first and second year candidates availed themselves boldly and bravely of the opportunities afforded to them, relying on the amount of knowledge which they considered they had already obtained; in the present year, it would seem that the candidates had studied for the purpose. He drew this conclusion from the facts that in the first year five out of nineteen were recommended by the Council to prepare themselves more fully, while out of the remaining fourteen eight passed: in the second year, three out of twenty were withdrawn, and nine of the remainder passed: in the third year, there were not five candidates ready: and in this fourth year, there was only one name withdrawn out of six, and all the five have passed in the satisfactory manner which the meeting has just heard from the Honorary Secretaries: that is to say that the standard of qualification has already raised itself, or rather has been raised by the exertions of the candidates themselves just one hundred per cent. Mr. Papworth was anxious to use the words "by the exertions of the candidates themselves," because he really thought the standard of excellence required in the works produced in the presence of the Moderators had not varied from that level which had been proposed in the "Sketch of a Form of Examination Paper:" and it must be remembered that on this occasion the Council had no power of showing any leniency.

In this year, the Examiners compared with the drawings which were submitted to them, those made in the two previous Examinations; and it was found that the most recent ones were in some respects better than the earlier productions. But Mr. Papworth felt authorized to express an opinion of Mr. Ashpitel to the effect that the papers also were better. Mr. Nash and Mr. Papworth having undertaken this year, for the first time, the duties of Examiners, were not capable of pronouncing, off-hand, a positive judgment upon that point; but Mr. Papworth having had the opportunity, as Moderator, of glancing over the papers of the first two years, felt that this assertion carried with it an air of perfect correctness.

The Institute would, perhaps, recollect that he had expressed last year no disappointment at finding that no candidates were ready for examinations; he then felt that there must be students somewhere, and applauded their judgment in waiting until they thought themselves capable of

passing. In one respect, he slightly differed from one of the most earnest promoters of the success of the Examination. Professor Lewis seemed to think that, as there was no competition in the class of proficiency, students would do well to come forward and try to pass. Theoretically, that was very good doctrine; but Mr. Papworth thought that, practically, human nature would not bear it: it was sufficiently distressing, he supposed, to a student to know that his education was too deficient to allow him to pass, without the addition of announcing the fact to his friends by a failure. Mr. Papworth would rather see a moderate number of candidates in each year, without a failure amongst them, than fifty candidates and a list of only twenty-five passes. There was, perhaps, something selfish in putting this view before the meeting, but he might be excused when he said that until this year he had no definite idea of the amount of labour imposed upon the Examiners; more than twenty drawings, some answering four or five questions, and about a hundred and fifty answers to questions, had been transmitted to them by the Moderators. The larger part of these had to be separately examined and valued for marks; and, allowing only a quarter of an hour to each, that was a very good week's work of no slight difficulty. He left the meeting to consider the pressure when these numbers were trebled, or were even only doubled.

The existence of the Voluntary Architectural Examination was, he supposed, assured for many years: all those who had passed must necessarily be amongst its warmest as well as most influential supporters; and all the duty of the Institute for the future seemed to be the annual arrangement for the Examination, whenever there was a sufficient number of candidates. This number, the time of holding the Examination (say, in May or June, rather than in January), and some other detail, including a decision as to the amount of fees, would have to be considered by the Examiners before reporting to the Council, as directed by the Regulations. Then the Institute would probably also be asked to decide upon the retention of the two classes, or the creation of more; the form of the certificate granted to passed candidates, and other matters of importance to students; for which decision they would try to prepare by obtaining in evidence the opinions of their predecessors as Examiners, the past and present Professors in the Royal Academy and University and King's Colleges (London), the four Architectural Societies who prompted the Institute to take upon itself the labour and expense of this good work, especially the Architectural Association, and the gentlemen who have passed, not neglecting the sound advice, which he was sure would be given by the Moderators, to whom the Examiners were, and always would have to be, very much obliged.

Probably something would be said at the present meeting about the series of discourses which had been proposed two years ago by Professor Kerr, and by Mr. Hayward, and which had been organized last year. For his own part he thought that it would be desirable to repeat that experiment, as the papers were, almost all, too valuable to be allowed to fall into oblivion; but he had put that opinion into the hands of the Council, which, he supposed, was waiting for some expression of feeling on the part of the members of the Institute. The expense would be trifling; and, as he believed, the authors of the papers were not disinclined to give their services again; but the paucity of attendance was shameful.

As the members of the Architectural Association had requested the Council to consider several points urged in a memorial to it, the Voluntary Architectural Committee was appointed last year to make such suggestions upon the Regulations as might appear to be desirable for adoption by the Council; after a conference with some of the members of the Association, the Committee reported to the Council, and the alterations then made appear to have been successful in their operation.

He could not conclude without saying that he hoped some member would do what he, as an Examiner, could not undertake, viz.—would propose, formally, the approval of the Institute of the

profession, and anxious to obtain the honours which the Institute offered. He did not see why the number of marks should not be published; it was done in the case of the Government Examinations, and he saw no reason why it should not be done in this case. With regard to Mr. Watson, who had passed in the class of distinction, it was gratifying to find that his success on the last occasion had stimulated him further to pursue his studies, and to come up for examination in a higher class; and he looked forward to that gentleman gaining a very high position in his profession. They had no envy in this respect, but it was their greatest pride to see young men vindicate the high standard that their art ought to possess all over Europe. He was also much gratified by the statement of Mr. Edwin Nash, that one of the candidates in the class of Proficiency would have stood a very fair chance of passing in the higher class of Distinction. He felt that they were very much indebted in the first place to the Examiners and Moderators, for the kind attention they had bestowed, and also to the young men who had so nobly come forward in vindication of the Examinations which this Institute has established. They had in this respect conferred a high honour upon the Institute, and those who, like his honourable friend in the chair, were at the top of the tree, must feel great pleasure in seeing them, day after day, acquiring more knowledge, and gradually arriving at that high point which would gain for them the admiration of all around them.

The CHAIRMAN stated that, in accordance with the Regulations referred to in the Report of the Examiners, the Council had determined to call together those gentlemen recommended by them to reconsider the whole scheme of Examiners, and report thereon. After which, it would be the duty of the Council to take the sense of the general body upon the whole subject. This revision was provided for after the three first Examinations, in order that the experience gained in the working of the scheme might be taken as a guide for future arrangements, so that these Examinations might be put upon the best possible basis, and carried on in the most satisfactory manner.

PAPERS OF QUESTIONS
FOR THE
THIRD VOLUNTARY ARCHITECTURAL EXAMINATION,
HELD BY THE
Royal Institute of British Architects.
1866.

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|---------------|-------------------------|------------|
| EXAMINERS - - | ARTHUR ASHPITEL, F.S.A. | } Fellows. |
|               | EDWIN NASH. - - - -     |            |
|               | JOHN W. PAPWORTH. - -   |            |
|               |                         |            |
| MODERATORS -  | CHARLES FOWLER, JUN. -  | } Fellows. |
|               | T. ROGER SMITH. - - -   |            |

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NOTICE TO CANDIDATES.

Each Candidate is expected, on entering the Examination room, to proceed immediately to the seat that may be assigned to him; to maintain quiet and silence; to address himself only to the Moderators in case he may require explanation or assistance; and to conform to their arrangements.

Answers are to be written only on one side of the paper. A margin of about one inch is to be left on the left-hand side of each page; and the answer to each question is to be begun at the top of a fresh page. The division and number of each question is to be written in the margin opposite the first line of the answer upon each page employed. The Candidate's number is to be put at the corresponding bottom corner of each page. The papers of answers are to be delivered in half sheets with the papers of questions to the Moderators, who will fasten them together, attach their own signs on the right hand top corner, and remove the numbers put by the Candidates.

A larger number of questions has been given than it is expected the Candidates can answer in the time allotted. This is done in order that they may have the *advantage of selection*; and the Examiners wish to impress most earnestly upon the Candidates the necessity of attending to the *correctness* of the answers, rather than to the *number* of them.

The mathematical subjects must be strictly worked out; the propositions from Euclid and the riders are to be considered as distinct questions, and are to be answered separately. It is not necessary that the questions in Physics, Professional Practice, and Materials should be worked out, in detail, further than is requisite to show that the Candidate has a competent knowledge of the subject; but mere indication of the rule will not be a sufficient answer.

It must be clearly understood that the Examiners wish to develop and recognize what the Candidates do fairly know, and not to try and throw difficulties and perplexities in their way.

CLASS OF PROFICIENCY.

FIRST DAY.—MORNING AND AFTERNOON.

DESIGN AND DRAWING.

The grand staircase, to a public building, contained in a hall 60 feet by 40 feet; the ground stor 25 feet, and the upper 15 feet, high from top of floor to top of floor; the length of tread to be not less than 8 feet.

To be in the style which the Candidate has selected; and to be drawn (in pencil will be sufficient) *not sketched* to a scale of a quarter of an inch to a foot: no colour except Indian ink is to be used.

The drawings to consist of at least one plan, and two sections, shewing roof, windows, and other necessary features. The *details* of construction will be required to be drawn on a subsequent day to larger scales.

The Staircase itself is to be considered the important part of the design, and to be carefully studied.

SECOND DAY.—MORNING.

MATHEMATICS.

Arithmetic.

N.B. The French mètre is 39·3708 English inches, or 3·2809 English feet. The Tuscan braccio is 22·98 English inches; and the Roman palm 8·796 English inches.

1. Extract the square roots of 443556; of 603729; of 6 to four places of decimals; and of 60 to the same.
2. The usual approximation of French to English measures is to call the mètre 3 ft. 3½ in. how far does this differ from the true decimal?
3. Being unexpectedly called on to measure a length of park wall, and obliged to borrow 50 ft. tape for the purpose, the length comes out 1510 feet. On bringing home, and proving, the tape it is found to be 1 inch ¾ths too long; what is the true length when corrected?
4. If 24 navigators can excavate a large foundation in 6 days, when they can work 12 hours a day; in what time can 30 perform the same work in winter, when they can only work 8 hours a day?
5. An Italian architectural work states that a church measures 212 braccia in length; another gives the same length as 545 Roman palms; what is the difference between the two statements?

6. Calculate the following claim against a Railway Company, and write out the same fair as if to be delivered to the umpire.

(1.) A ground rent of £12. per annum for 5 years.

The reversion to the rack rent of £120. per annum in perpetuity after such term.

Less :—15 per cent. for losses, repairs, collection, &c.

„ Insurance of £1600. at three shillings per cent.

Add 10 per cent. for compulsory sale.

N.B.—Take the tabular value of the ground rent for the 5 years at 4·579 years purchase; and that of the reversion to the house on the 6 per cent. tables at 16·666 years purchase, less 4·212 years purchase for the outstanding term.

(2.) A piece of freehold ground fit for building on immediately, 1240 feet frontage, at 7 shillings per foot per annum, allowing 2 years of rent at a peppercorn and 6 years to cover.

N.B.—Take the building ground at 25 years purchase, less 4·452 years purchase, being the deferred period of the peppercorn and 3 years (the mean of 6) to cover.

Add 15 per cent. for compulsory sale.

Add also your own commission on the whole valuation at 1 per cent. on the first £1000, and $\frac{1}{2}$ per cent. on the remainder.

Algebra.

1. Add together $(a + b)x + (b + c)y$, and $(a - b)x - (b - c)y$; also subtract the same from the same, and explain the rule relating to *minus* brackets.

2. Divide $a^3 + b^3 + c^3 - 3abc$ by $a + b + c$ in the ordinary manner, and shew how the same may be done by brackets.

$$\text{Multiply } \frac{a^2 + b^2}{a^2 - b^2} \text{ by } \frac{a - b}{a + b}$$

Divide the same by the same; and explain the rule.

3. What are the square roots of

$$9x^2 - 3x + \frac{1}{4} \text{ and of } m^3 + 2m - 1 - \frac{2}{m} + \frac{1}{m^2}?$$

4. Solve the following equations—

$$(a) \quad \frac{1}{2}(9 - 2x) = \frac{3}{4} - \frac{1}{10}(7x - 18)$$

$$(b) \quad \sqrt{x^2 + a^2} + x = b$$

$$(c) \quad \frac{1}{x} + \frac{1}{a} = \sqrt{\frac{1}{a^2}} + \sqrt{\frac{4}{b^2 x^2} + \frac{1}{x^4}}$$

$$(d) \quad (x + 1)(y - 9) = (y + 7)(x + 5) - 112$$

$$3y - 2x = 9$$

5. An architect invests £6000. for a lady in two mortgages, one at 4 per cent., and one at 5 per cent. He is in the country, and the deeds are with her solicitor, and she wishes to know the amounts of each mortgage separately. She receives as interest £264. per annum in all; what are the respective sums invested?

6. An architect has a large quantity of walling to execute, and finds he has funds enough at command if the same can be done for £14. per rod. If the work be of stone wholly it will cost £20. per rod; if of brick wholly it may be done for £12. per rod. If he uses brick faced with stone; how much of the latter may be used in proportion to the former to bring the work to the prescribed £14. per rod.

Euclid. Book 1.

1. What are the definitions of a square, oblong, rhombus, rhomboid, and trapezium?

2. Prop. 5.—Theorem. The angles at the base of an isosceles triangle are equal to one another; and if the equal sides be produced, the angles on the opposite side of the base shall be equal.

Given the vertical angle, and a side to construct the triangle.

3. Prop. 35. Theorem. Parallelograms upon the same base and between the same parallels are equal to one another.

Shew this is equally true of triangles.

4. Prop. 44.—Problem. To a given straight line to apply a parallelogram, which shall be equal to a given triangle, and have one of its angles equal to a given rectilineal angle.

Book 2.

5. What is the definition of the gnomon of a parallelogram?

6. Prop. 12. Theorem. In obtuse angled triangles, if a perpendicular be drawn from either of the acute angles to the opposite side produced, the square of the side subtending the obtuse angle is greater than the squares of the sides containing the obtuse angle, by twice the rectangle contained by the side upon which, when produced, the perpendicular falls, and the straight line intercepted without the triangle between the perpendicular and the obtuse angle.

7. Prop. 14.—Theorem. To describe a square equal to a given rectilineal figure.

SECOND DAY.—AFTERNOON.

PRACTICAL GEOMETRICAL DRAWING.

1. Assume two lines, and draw a third proportional thereto.
2. Divide a line (say $6\frac{1}{4}$ inches long) into thirteen parts by one geometrical operation.
3. The diagram, fig. 1, in the margin represents two fields A and B with an irregular boundary between them; enlarge the same to four times the scale; and draw, with a parallel ruler only, without compasses, an equalizing, or give and take line, so that the boundary between the two fields may be straight, and each have the same contents as at present.

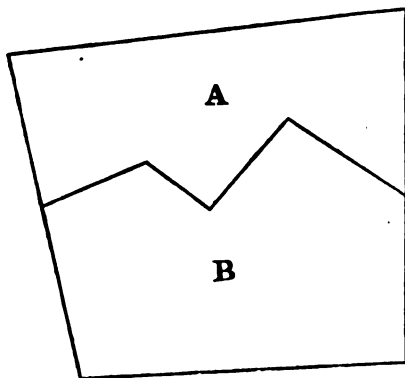


Fig. 1.

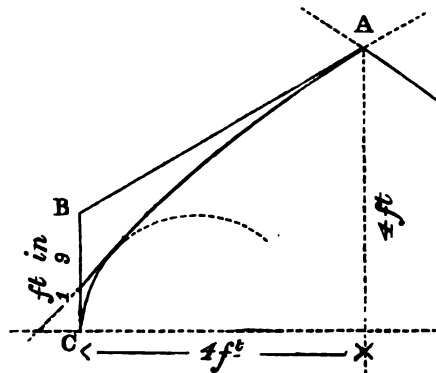
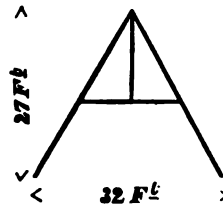


Fig. 2.

4. Lay down the dimensions on the margin half inch to the foot, and find the centres and draw a four-centred gothic arch, as fig. 2, the circles being tangents to A B, B C, and the curves continuous.
5. In designing some geometrical windows with circles in the heads of the tracery, it is determined to place in one a cinque-foil, and in another three equal and similar pear-shaped figures, find the centres, and draw the cusplings.
6. How are the lines found for the voussoir joints to a true elliptical arch?

MENSURATION.

1. The sides of a triangle are 30, 36, and 42 feet, what is the superficial content?
2. The sides of an equilateral triangle measure 4 feet each; those of a square 3 feet each; those of a regular hexagon 2 feet each; a circle girts 12 feet round: what are the respective areas of each of these figures? Shew from this that perimeter is no guide in computing superficial area unless the figure be given.
3. An early English roof is 32 feet span, and rises 27 feet, the collar is half way up the rafter. What are the lengths of the rafters, collars, and king posts, supposing the dimensions given to be outside measure?



FOURTH DAY.—MORNING.

CONSTRUCTION.

1. Supposing there to be a basement under the hall you have designed, how would you propose to carry the stone paving?
2. Draw to large scales all the details of the steps of the stairs, their front and back joints, and all connections thereto, and write specifications for the same. The like for the landings, and the enclosing rail, or perforated balustrade.
3. Draw to a large scale the wall, the plates, rafter feet, hammer beams, curved braces, and all other detail connected with the springing of your roof. Also the straps, bolts, stirrups, ties and other iron work throughout the same.
4. What is the usual method of fixing centres for turning arches, groins or other vaulting, and what are the proper precautions in striking the same? Exhibit this by large scale sketches based on your previous work.
5. In what way do fitches of iron boiler plate increase the strength of timber girders, and what is the formula for calculating their strength?
6. Describe the various sorts of glass used in building, as Crown, Sheet, British Plate, Patent Plate, &c. Describe also as far as you know their component parts, and the method of manufacture of each.

FOURTH DAY.—AFTERNOON.

HISTORY AND LITERATURE.

1. Give a *short and succinct* list of the various styles of architecture from the earliest ascertained period, with their succession and approximate dates.
2. Give a *full and complete account* of the style you have selected, with its origin, progress, transition, and decline. Give careful accounts, accompanied by sketches of the doors, windows, buttresses, parapets, pitch of roofs, and of arches, character of towers, turrets, battlements, pinnacles, piers, caps, arch-moulds, labels, corbels, cuspings, foliages, and other decorations, illustrated by such sketches as you may be able to execute in the time.

The Candidate is desired to write this out carefully, and rather to regard the correctness of his work than its length or amount.

CLASS OF DISTINCTION.

FIRST DAY.—MORNING AND AFTERNOON.

Give a design for a Pavilion (with a terrace and flights of steps, on the side of a lake), consisting of a boat-house under a saloon; with retiring room, kitchen, keeper's room, and two bedrooms. To be in the style which the candidate has selected; and to be drawn (in pencil will be sufficient) *not sketched* to a scale of one-quarter of an inch to a foot.

The drawings to consist of at least two plans, one elevation, and one section. The use of colour is permitted; practical details of construction are not required; but in their stead decoration to a larger scale may be given if there be time for it.

SECOND DAY.—MORNING.

Draw to a scale of half an inch to a foot, the details of the upper thirty feet of the right hand angle of the Ground-Story Building, as drawn in the elevation, and show the return of the ornamental terminal, or acroterium; the balustrade need not be included.

Sections of mouldings to be to a scale of one inch to a foot.

Careful drawings required.

SECOND DAY.—AFTERNOON.

PROFESSIONAL PRACTICE.

1. What is the custom in taking out quantities, and by whom is it usually done? In what cases is it permitted for the architect to take out his own quantities?

2. In what cases is an architect liable for any failures in a building from insufficient design, or faulty execution of works; and when and to what extent is he liable if the failures arise from hidden causes, and things not likely to be suspected, as deceitful and fraudulent work, &c.; and what is the best way to prevent such results?

3. Write out a specification of one trade (or more as time may permit) for the building designed by you on the first day.

4. What is meant by "a case of light and air."

5. In scheduling fixtures, what defects require notice.

6. Sketch the course of an arbitration in which you are one of the referees and in which an umpire has to be chosen.

THIRD DAY.—MORNING.

Algebra.

1. (a). Bracket the expression $ac - ad - bc + bd$ into its two factors.
 (b). Out of 18 shillings I have to pay 8 shillings all but 3d., express this in shillings by a plus and by a minus bracket, and state the rule.

2. Multiply $\frac{15a^3c}{5b^2c^2}$ by $\frac{9a^2c^4}{30ab^2c^2}$, and divide the same by the same.

3. (a). What is the sum and difference of

$$\sqrt{72} \text{ and } \sqrt{128} \text{ and the sum of } \sqrt[3]{40} - 3\sqrt[3]{320} + 4\sqrt[3]{135}$$

4. Shew that $\frac{2}{\sqrt{2} + \sqrt{5}} = \frac{2}{3} \cdot (\sqrt{5} - \sqrt{2})$ and that $\frac{\sqrt{a^2 - x^2}}{2} + \frac{x}{2}$ is the square root

$$\text{of } \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{4}$$

5. Solve the following simple equations:

$$(a). \frac{2}{x} + \frac{3}{x} + \frac{4}{x} + \frac{5}{x} = 56$$

$$(b). \frac{\sqrt{x} - 2}{3} + 3 = \frac{x - 4}{\sqrt{x} + 2}$$

$$(c). \begin{aligned} (x + 1)(y - 9) &= (y + 7)(x + 5) \\ 3y - 2x &= 9 \end{aligned}$$

6. Also the following quadratics:

$$(a). x^2 - 4ax = -7a^2 \quad (b). 4x - \frac{14 + x}{x + 1} = 14$$

$$(c). \begin{aligned} x^2 + y^2 - x - y &= 78 \\ xy + x + y &= 39 \end{aligned}$$

7. On looking over some old accounts it is found some land is leased from one of the Colleges at £10. per annum in money, and at an annual rent of a certain number of bushels of corn which are not named, but it is found when corn is 10s. a bushel the College received 10s. per acre, and when it fetched 13s. 6d. a bushel they received 13s. per acre. Of how many bushels did the corn rent consist?

8. A chancel is paved with sets of Minton's tiles, each consisting of 4 tiles 6 inches square, and of course each set being 1 foot superficial. The centre is paved with the best quality of encaustic tiles, and measures 18 feet by 12 feet. The margin is paved with tiles of plainer design, and contains exactly as many sets as the middle. How wide is this margin?

9. An architect for a special purpose orders some fine solder to be used, consisting of two parts of tin to one of lead. Not satisfied with the work he weighs 120 drachms *in vacuo*, and again in water, when he finds the weight is 14 drachms less than before. On looking to the tables he finds 37 parts of tin lose 5 parts, and 23 of lead lose 2 parts when weighed in water. How much do the proportions differ from the specified standard?

Euclid. Book III.

Proposition 17. Problem. To draw a straight line from a given point, either without or in the circumference, which shall touch a given circle.

32. Theorem. If a straight line touches a circle, and from the point of contact a straight line be drawn cutting the circle; the angles which this line makes with the line touching the circle, shall be equal to the angles which are in the alternate segments of the circle.

Shew from this how to describe the segment of a circle which shall contain an angle equal to a given rectilineal angle.

Book IV.

Proposition 10. Problem. To describe an isosceles triangle having each of the angles at the base double of the third angle.

Book VI.

Proposition 2. Theorem. If a straight line be drawn parallel to one of the sides of a triangle, it shall cut the other sides, or these produced proportionally; and conversely, if the sides, or the sides produced, be cut proportionally, the straight line which joins the points of section shall be parallel to the remaining side of the triangle.

Shew from this how to find a third proportional to any two given lines.

Proposition 13. Problem. To find a mean proportional between two given straight lines.

THIRD DAY.—AFTERNOON.

MATHEMATICS AND PHYSICS APPLIED TO PRACTICAL PURPOSES.

Tables of Logarithms will be on the table.

1. How do you find the characteristic and the mantissa of logarithms?

2. Resolve the following:

(a). What is the logarithm of 0.7853982.

(b). What is the natural number of log: 0.497149.

(c). Multiply 45756, by 87754, and divide the last by the first.

(d). What is the square root of 10201, and the cube root of 101.

3. Draw a right angled triangle, A B C, and shew by describing circles from the acute angle A as a centre, which sides are respectively radius, sine, cosine, and tangent; produce the two sides and draw a second perpendicular, and shew by letters which lines then will be the radius, sine, cosine, tangent, co-tangent, secant, co-secant, versed sine, and co-versed sine. Draw also the complements and supplements of the angle.

4. Prove the following theorems and reduce the same to their simplest form, supposing the radius to be 1.

$$\begin{aligned} \text{Sine } A &= \sqrt{\text{rad}^2 - \cos^2} = & ? \\ \text{Co-sine } A &= \sqrt{\text{rad}^2 - \sin^2} = & ? \\ \text{Secant } A &= \sqrt{\text{rad}^2 + \text{tang.}^2} = & ? \\ \text{Tang. } A &= \frac{B C}{A C} = & ? \end{aligned}$$

5. Wishing to know the height of a tower and spire, I measure backward a length of 200 feet from the tower wall, and observe the vertical angle to be $37^{\circ} 15'$. The tower is 24 feet square, and the level line from the station cuts 4·3 feet up the tower; what is the height?

6. The width of a river is required in a city where there are no means of measuring a base along the bank, nor of retiring and making two observations. I accordingly obtain leave to observe from a high warehouse, and find a spot on one of the lower windows exactly level with a mark on the opposite bank. I then go up to the top of the warehouse and observe the same mark from a window 86 feet higher than my former station, and observe the former mark reaches an angle of depression with the horizon of $18^{\circ} 35''$; what is its distance?

Physics, &c.

1. What is the great law in physics as to the gain and loss of power and time? Explain this by the motion of either order of levers, and also by a series of pullies.

2. What is meant by specific gravity; by whom was it discovered, and how? Exemplify its uses and shew how the specific gravity of a compound subject is found.

3. Give a short outline of the principles on which any science or branch of science you may select is based, and the method in which it is taught, as Geology, Chemistry, the laws of Heat, Light, Motion, and pressure of Fluids, &c., and in particular shew how they bear on matters which come under the notice of the architect.

FOURTH DAY.—MORNING.

MATERIALS.

The Candidate is requested to look through this paper, to select therefrom any one or more of the subjects to which he has given particular attention, and to write as full and complete an account of them as time will permit, rather than to give discursive answers to the whole, or a majority of the questions.

1. Give an account of the different stones used in building, their geological classification, their nature and density, and the method in which they are cut, sawn, or otherwise worked, as the granites, syenites, the limestones (as rag, Portland, oolites, magnesian, &c.), the sand-stones, as Bramley Fall, Yorkshire, Reigate, fire-stone, &c., and describe their bed and cleavage.

2. The like of the various Marbles, as Serpentine, statuary, Sicilian, veined, black and gold, St. Anne's, brocatella, &c., &c., the English marbles, alabaster, &c., &c.

3. Describe the various sorts of timbers in use in building, and from whence they come: the different qualities of teak, Spanish and Honduras mahogany, and cedar; the characteristic of Riga,

Dantzic, Memel, Archangel, Bjornborg, Swedish, red pine, yellow pine, pitch pine, and spruce, fir and deals. In what scantlings do they commonly come over, and for what purposes are they used?

4 Which are the best marks of pig lead, how is it milled? Explain the modern method of drawing pipe. What is the difference between fine and common solder?

5. Explain the difference between the old and new methods of using zinc. Why did this material fail to so great a degree, and why is there reason to believe, under the modern system, it will prove a very valuable roof covering?

6. Describe the various qualities of lime. What is meant by rich, poor, and hydraulic limes? What quality is intended by the last designation, and to what substance does it owe its power?

7. What are the usual component parts of common house painting? Which are the best oils, and species of white lead, and how are they adulterated? To what substance does "flatting" owe its peculiar absence of glitter?

FOURTH DAY.—AFTERNOON.

CONSTRUCTION.

1. Supposing the lower part of the building designed by you to be groined, draw a bay of such vaulting, with the springers, &c., and shew how to find the groin points.

2. Supposing it to be covered with timber and a lead flat, and supposing the room over part (as shewn) to be 30 feet span in the clear, how would you support the floor, if there were to be no columns below, nor tie nor suspension rods, and no iron girders?

3. Sketch to half-inch scale the roof over a similar room (namely, 30 feet in the clear) without internal support. What is meant by wind bracing,—for what purpose is it used, and how is it generally executed?

4. If the rail to your staircase be a continued rail of mahogany, what section would you propose, what iron core, and how would you connect such core with the cast iron balusters? In such a rail, what is the difference between a butt joint and a Vandyke joint?

5. What are the different bonds in brick-work, and in what way is it frequently defective in a two-brick wall? How are the outside joints usually finished or "struck"?

6. How should slate cisterns be put together to prevent leakage, and what iron stays would you advise to those of large dimensions, and where would you place them?

FIFTH DAY.—MORNING.

TRANSLATIONS.

Italian.

1. Translate into English prose the following passage from Milizia, "Saggio di Architettura Civile":

"L'Architettura, come ogni altra bell' arte, è soggetta alle seguenti regole generali.

- 1°. In tutte le sue produzioni deve regnar sempre un piacevole rapporto tra le parti e il tutto ; il che è compreso sotto il nome di *simmetria*.
- 2°. Deve regnarvi *varietà*, che tolga allo spettatore la noia, e *unità*, che gli impedisca il disordine e la confusione ; e questo è compreso dalla *euritmia*.
- 3°. È neccessaria la *convenienza*, ossia il *decoro*, che faccia un giusto uso della simmetria, e della euritmia, e di quella relazione, che deve passare tra un edificio e il suo destino, tra gli ornamenti e la qualità della fabbrica, adattandole i più propri, e i più convenienti alla sua magnificenza, mediocrità, o semplicità.
- 4°. Se l'architettura è figlia della necessità, tutto il suo bello deve comparir necessario, e fatto per il bisogno. In niuna arte di piacere deve mai scoprirsi l'artificio ; onde tutto quello che si fa per mero ornamento è vizioso."

2. From what words are the following derived: compreso, tolga, impedisca, faccia, deve and scoprirsi.

3. Mention any idioms which may suggest themselves to you, and give any critical remarks on the style that time may permit.

4. Translate into Italian prose the following passage from Sir Joshua Reynolds' 13th Discourse :

"To pass over the effect produced by that general symmetry and proportion, by which the eye is delighted, as the ear is with music, architecture certainly possesses many principles in common with poetry and painting. Among those which may be reckoned as the first, is, that of affecting the imagination by means of association of ideas,"—"hence it is that *towers and battlements* are so often selected by the painter and the poet to make a part of the composition of their ideal landscape ; and it is from hence, in a great degree, that, in the buildings of Vanbrugh, who was a poet as well as an architect, there is a greater display of imagination, than we shall perhaps find in any other."

French.

5. Translate into English from Viollet Le Duc, Vol. IV. p. 1.

“La construction est une science ; c’est aussi un art, c’est-à-dire qu’il faut au constructeur le savoir, l’expérience, et un ~~sentiment~~ naturel. On naît constructeur ; la science que l’on acquiert ne peut que développer les germes déposés dans le cerveau des hommes destinés à donner ~~une~~ emploi utile, ~~une~~ forme durable à la matière brute. Il en est des peuples comme des individus : les uns sont constructeurs dès leur berceau, d’autres ne le deviennent jamais ;”—“la construction est le moyen ; l’architecture le résultat ; et cependant, il est des œuvres d’architecture qui ne peuvent être considérées comme des constructions, et il est certaines constructions qu’on ne saurait mettre au nombre des œuvres d’architecture. Quelques animaux construisent, ceux-ci des cellules, ceux-là des nids, des mottes, des galeries, des sortes de huttes, des réseaux de fils ; ce sont bien là des constructions, ce n’est pas de l’architecture.”

If time will permit make any remarks on idioms, &c. as desired in No. 3.

6. Translate into French the following passage from Lord Macaulay’s History of England, Vol. I, p. 412.

“It is true that in architecture, an art which is half a science, an art in which none but a geometrician can excel, an art which has no standard of grace but what is directly or indirectly dependent on utility, an art of which the creations derive a part, at least, of their majesty from mere bulk, our country could boast of one truly great man, Christopher Wren ;”—“the austere beauty of the Athenian Portico, the gloomy sublimity of the Gothic Arcade, he was, like almost all his contemporaries, incapable of emulating, and perhaps of appreciating : but no man, born on our side of the Alps, has imitated with so much success the magnificence of the palace-like churches of Italy. Even the superb Lewis has left to posterity no work which can bear a comparison with St. Paul’s.”

Architectural Nomenclature.

7. Translate into the various languages you have chosen—

Transom, Girder, Rafter, King and Queen Posts, Base, Shaft, Necking, and Capital of a Column, Apse of a Church, Flying Buttress, Gutter, Ridge, and Gable.

Also into English—Cancello, Baldacchino, Mensola, Goccie, Fregio, Scapo, Lastrico, Opera di Mattone, Lavoro di Falegname, Intonaco, Lavagna, Trave Maestra.

Also—Tailloir, Congé, Larmier, Renflement, Cannelures, Contre-fort, Arc-boutant, Sablière, Solive, Poutre, Poteau de Remplissage, Linteau, Décharge, Portée, Poussée.

Also—Säule, Bogen, Kragstein, Verzierung, Grundriss, Kloster, Knopf, Schiff, Arbeit und Baustoffen, Maurer, Zimmermann, Hausmaler, Baumeister, Unternehmer.

FIFTH DAY.—AFTERNOON.

HISTORY AND LITERATURE.

1. Give a short and succinct account of the various orders of the architecture of Greece and Rome till its decline. **50**
2. Give as full and careful an account of the revival of the same, as time will permit, with as complete a history of the various architects engaged therein; their principal works, and the characteristics of their styles, the great patrons of art and the writers on the same, with dates as nearly as you may remember them. **50**
3. What is the present state of such art now in France, and what are its characteristics? **50**

It will be easily understood that, because no perfect example exists of such a hypæthral temple as Vitruvius has described, the commentators upon his description have differed in their deductions and inferences to such an extent that the subject has become a riddle stated in this form,—“How was any roofing put to a temple that had no roof in the centre.” It will be equally easily comprehended that at the very outset of an attempt to solve the riddle, another puzzle presents itself in this shape,—If some temples had no roof in the centre, how was the roofing put to a temple that had a roof over its centre? The object of this paper is an endeavour to answer these questions; and in its course a discovery made by myself will be submitted for consideration, as it appears to some of my friends of sufficient importance to be brought before the Institute.

Eliminating the words *in the centre* the first question will stand thus,—How was any roofing put to a temple that was roofless? This is not so absurd as it sounds: for it intimates that there were ancient temples that were roofless. If satisfactory evidence for the existence of such buildings be adduced, great part of the difficulty attending any illustration of the Latin text will be obviated: and, because my memory does not recall any previous quotation of the words, even by those who have tried to collect the passages in Pausanias relating to the hypæthrum, this will be a good opportunity to cite that author (Attica); he states in the first Chapter that by the road from Phalerus to Athens is a temple to Juno, which has neither doors nor roof, *ἔστι δὲ κατὰ τὴν ὁδὸν τὴν εἰς Ἀθήνας ἐκ Φαλήρου ναὸς Ἥρας οὐρε θύρας ἔχων οὐρε ὀροφον*, and this is all that he does say about it; in the fortieth chapter he notices a temple to Jupiter Pulvereus, which has no roof, *καὶ Διὸς Κονίου ναὸς οὐκ ἔχων ὀροφον*, and, likewise, this is all that he does state in regard to it. If he did not mean that these temples were ruined, they could only exist under two conditions, namely, having walls without external columns, or with them. My impression would be that the first of the two temples just named could have had no columns, but that the second might have had some such decoration applied to it. In fig. 2 of the accompanying illustrations (which are merely diagrams without the attempt to captivate your judgment by the application of any ornament) may be seen an idea of a temple which has neither doors nor roof; if one of the walls were taken down, the rest would be a sufficient representation of a mosque to the most scrupulous Mahometan; and therefore this, doubled, will relieve me from the imputation of putting before you something which would be inadequate for the religious services of Eastern countries. If the upper part of the openings be closed, the illustration fig. 3 serves to represent my idea of the second of these temples mentioned by Pausanias, which might have had some decoration by columns applied to it. Treating this decoration as of the simplest kind, namely, as a pair of columns *in antis* under a pediment, the evident result is the answer to the first question, for it shows how some roofing might be put to a temple that was roofless. The extension of this porch into a peristyle is so simple a matter as not to require more than an allusion to it, and we arrive at once at the peristyled hypæthral edifice, which may be supposed to be represented in fig. 4, that is a perspective view of a tomb at Cyrene.

The idea of adducing two of the illustrative diagrams now submitted is due to our late venerated President. In his folio work, ‘The Temple of Jupiter Panhellenius,’ &c., published in 1860, he observes on page 18, that “the clearest evidence of the hypæthral opening in the roof is given by the covers of sarcophagi formed in imitation of temples.” It was his suggestion that made me seek in Beechey’s ‘Expedition to the Northern Coast of Africa,’ published in 1828, the tomb at Cyrene; from the measured dimensions that have been obtained by me of another tomb of similar character in that locality, this appears about 20 ft. long by 6 ft. wide, and 8 ft. high from the ground to the ridge. Mr. Cockerell also referred in his work to the sarcophagus at Rhœnæa, near Delos, with a sketch of it (here copied, fig. 10) prepared in perspective from the geometrical representations given in the supplementary volume to Stuart and Revett’s ‘Antiquities of Athens,’ published in 1830, and edited by

Kinnard, whose suggestion that the two holes were intended as sockets for statues will, in my opinion, be set aside in favour of that which emanated from Mr. Cockerell, supported by the still more extraordinary instance afforded by the example shown in the accompanying rough sketch (fig. 6) of a lid of a sarcophagus from Crete. This example was kindly indicated to me by Dr. Birch, of the British Museum. As one of the treasures stored in the crypts of that establishment, it might have remained for years useless in the attempt at an elucidation of this subject; but when the article *Hypæthrum* in the 'Dictionary of the Architectural Publication Society' came to me in common with the rest of the Committee of Revisors of that undertaking, it seemed to me desirable (as its author, Mr. Ashpitel, was absent from London) to verify some of the references therein, and to consult Mr. Cockerell's valuable book, already mentioned, on the temples at Ægina and Bassæ, comparing it with Mr. Donaldson's work on the latter temple, as given in the supplementary volume by Kinnard previously named, for the proofs that these had been hypæthral, if not for the evidence of the manner in which the hypæthral character was exhibited in them. Now, with regard to the temple at Bassæ, it will perhaps be matter of surprise when it is necessary for me to say that Mr. Cockerell represented it, as well as that at Ægina, with a notch in the ridge; and at the same time furnished, in my humble judgment, tolerably decisive proofs that the ridges never had any notches in them. It is also necessary for me to say that it is generally understood that these designs in restoration were made many years ago, and that the late Professor had confined his attention in the ultimate publication of the work to the literary and æsthetical, rather than to the archæological, portion of his previous labours.

For a short time this part of my subject must be laid aside, in order to furnish to those who may have been ignorant of the way in which the covering was put to the roof of the Greek temples, some notion of ancient tiling. A very brief explanation will suffice, and will partly give an answer to the second question,—“How was the roofing put to a temple that had a roof over its centre.” The tiles had a rim called the *harmus*, ἄρμος, on three sides of the upper face, and perhaps on the bottom of the lower face. These tiles were laid close together on rafters, so that there was a rafter under each pair of coupled side-rims; the joints were covered by a suitably worked tile, called by the Romans *imbrex*, but by the Greeks σκληρός; and the roof became water-tight because the bottom rims of one range lapped over the top rims of the range next below it. Sometimes the end of the *imbrex* was a mere check, or stop, decorated with a palmette or other ornament; but in several cases the end resembles the upper part and head of a *stèle* and is decorated by painting or sculpture. The technical name for this stop appears, from Pliny, to be *persona*; but it is usually very improperly called an *antefixum* or *antifixa*. Sometimes the imbrices all finished at the eave, and there each ended with a *persona*, as in the cases of the temples at Ægina and at Bassæ, of the temple to Themis at Rhamnus, and of the Outer Propylæa at Eleusis. In other cases the *alternate* imbrices stopped short of the gutter, and then finished with a *persona*, as at the temple to Diana Propylæa at Eleusis; or without any *persona*, as at the temple to Nemesis at Rhamnus. The flat tile is represented to be thickest at the lower end in both the temples at Rhamnus. This system has been employed during ages in Italy for common roofing with tiles much less in size than those used at Bassæ, or at the Parthenon; but that it was employed by the Greeks, and executed by them in marble, was a point reserved for Mr. Cockerell and his colleagues (amongst whom the late Baron Haller must not be forgotten) to establish.

With regard to the application of such a method to magnificent structures in ancient times, Mr. Cockerell, speaking of himself and his coadjutors, observes on page 28 of his work already named, that “this most artificial and elegant mode of the covering of temples had already been discovered by us at the Parthenon, and the temples at Rhamnus and Eleusis, during the year 1811. It was justly admired as unknown till then, and pointed out to the commission of the Dilettanti Society, on their visit

to Athens in 1812, and reported by them to Mr. Wilkins," who published it in the 'Prolusiones' in 1837, pp. 15, 16, 21-6, pl. v-vii; and p. 10, translated *imbrex* as *gutter*. Pausanias, v, 10, thought it worth while to record the period of Byzes of Naxos (circa 590 B.C.) as the inventor of marble tiles; and Mr. Cockerell, p. 29, calls attention to the improvement made by Athenian architects, viz., the manufacture of the joint-tiles in the same piece with the larger one, by which one side was rendered impervious to wet. This was not the case at Ægina (circa 470 B.C.), nor at the Parthenon at Athens (438 B.C.), but was found at Bassæ (circa 431 B.C.); although in the two latter buildings the tiles were of marble. On the same page, he mentions that at Ægina "the eaves-tiles with the joint-tiles or ἀρμολαὶ attached to the antifixæ, together with those surmounting the pediment, and forming the cymatium or ἐκπίθηδας, were of Parian marble; those within this border were in a fine tile of light yellow earth, together with the saddle or ridge tile, and the painted antifixæ corresponding with those of the eaves, and surmounting the roof." He describes the tiles of the Parthenon as 2 ft. 3 in. square; whilst those of the temple to Apollo Epicurius at Bassæ, near Phigaleia, were 3 ft. 6½ in. long and 1½ in. thick, by 2 ft. 1½ in. wide, as shown in fig. 15, the eaves-tiles being 4 ft. 2 in. long. The tiling at this temple near Phigaleia he deems, p. 53, to be "worthy of particular notice, as the most complete description of the temple roof hitherto known to us. Seventeen rows of marble tiles, the largest hitherto found, cover the roof: the five central ones (possibly a smaller number) formed the compluvium or hypæthral opening to the cella; the extreme tile, with its corner shaped to its position, was happily discovered" (this passage deserves a very marked gift of emphasis to it); "quite decisive of this interesting fact, but not determining whether the width of the opening consisted of five or three of these tiles." It is to be regretted that the word *compluvium* should have been used in this passage; but without occupying time in giving reasons for that regret, let me say that as soon as my eyes devoured the statement that "the extreme tile, with its corner shaped to its position, was happily discovered," it was evidently desirable to see the tile itself. Few of us can be unaware that the relics from Bassæ were deposited in the British Museum: thither of course it was my first occupation to go in search of the necessary fragment. It was not there; but on my explaining to Dr. Birch the shape of the fragment, his acute mind detected that my purpose related to the hypæthrum, and was charitable enough to take me into the crypts to examine the tomb which has the lid shown in fig. 6.

On the whole, it is well that the fragment was not at the Museum, nor in the possession of Mr. Fred. P. Cockerell. Bound by the necessity of the case, my only course was to scrutinize jealously the illustration given by his lamented father; and then it seemed that a discovery worthy of your attention fell into my hands. The great authority just cited seems to have been in error when employing the term *hærmus* instead of *imbrex*, as well as when considering that this portion of a marble tile (as shown in fig. 20) was the corner of a notch in the roof. In his illustration of its face, pl. vii, the tile appeared to me to be placed with its end uppermost, and so far suits that theory as shown in his pl. v; but the moment that it is put in that which looked to me to be the true position as determined by his careful drawing of the end of the *imbrex*, the fragment is evidently the upper portion of the right side of a tile corresponding in size with the common tile in fig. 15, but having also a perforation or opening, surrounded by a chamfered fillet rising above the general face. The return of the lower part of the tile is suggested by the following facts; that, when such tiles were in place, the upper and lower border of the tile would appear to be equal in width; and that the fractures have occurred exactly where they might be expected if the restoration here drawn has truly represented a perfect tile. The raised fillet infers a movable rimmed cover, made either of wood or of marble. Mr. Cockerell's statement that seventeen tiles covered the two slopes is confirmed by the sizes above given of the eaves-tile and plain tile. When these facts are combined with the section of the temple determined by his dimensions, it appears, as in

fig. 13, that no more than three courses of open tiles, of the size indicated by him, could have been used on each side of the ridge; and the highest of these would have come next to the ridge-tile. If the border to each open tile did return, as above stated, it seems needless to discuss at great length the practical difficulties that would be involved by considering the fragment as the upper portion of the right side either of a wide *opening*, or of two or more *slits*, which must have been either 5 ft. or 8 ft. 6 long in the tiling: in either case the rafters to the ridge could not well be omitted, and the work could not be executed so truly as with separate open tiles.

The practical difficulties of putting anything but a complete roof on to a temple deserve some notice, however, because no one who has written upon the subject of the hypæthrum, except Mr. Cockerell and Mr. Donaldson, seems to have given sufficient thought to the effect which a proposed transverse section would have upon the flank or longitudinal elevations. A notch in the roof was always considered an improbability to the mind of my teacher, if merely on account of the bad effect of the optical illusion which it would create, viz., that of the ridge sinking in the middle. The attic, now confirmed by these two sarcophagi, was an idea for many years familiar to me as a disciple of my father, and was exhibited by me to the writer of the article *Hypæthrum*, already mentioned, while that excellent exposition of contending theories was under revision; he did not notice it, because, as he truly observed, it was not supported by me with precedent, nor had it been publicly advocated so as to deserve consideration with the theories that had been published. In a second edition that difficulty, after to-night, will have been removed. The necessity for carrying the rafters through the opening to support the ridge if it were to be continuous, is obviated by making a notch in the roof, or by erecting an attic, as in these two tombs, figs. 4 and 10, where the ridge is broken upwards instead of downwards. Some advocates of old theories will probably be startled at the declaration of an opinion that hypæthral temples *might* be roofed entirely: that is to say, at my answer to the first question—How was any roofing put to a temple that was hypæthral? which is, that it might be managed by such tiles as those it has been my endeavour to restore from Mr. Cockerell's drawing of *the extreme tile with its corner shaped to its position*, as he supposed it; placing them with a gutter within a parapet formed by an attic, as fig. 11, over pierced lacunaria: but at the same time, Mr. Fergusson must be left at liberty to use the tomb from Crete, fig. 6, if he will render it available in support of his own theory, in addition to which he must be permitted to apply figs. 7, 8, and 9, as found at Ægina.

It is not my intention to discuss the various theories relating to the hypæthrum, at least on this occasion; they have been so fully treated in the article to which I have already alluded, that it only remains for me to support my own view by one or two extracts from it. First, it shows that people like Professor Ross have denied that the hypæthrum ever existed in a *finished* building—then that some advocates of the existence of a hypæthral temple insist that it must have been covered and must have had light somewhere: next it shows that if Vitruvius is to be believed, the centre was open: that a *religious dogma* was the *only reason* for the existence of *this open centre*: that no mere awning would have been a sufficient protection to the chryselephantine statues: that the temples at Ægina and at Bassæ were hypæthral; and that it would have been held *nefastum*, indeed impious, not to have left a vertical open space in their roofs: and more important than all, that the break or notch would be very little noticed, as the pitch is so flat; as the temples are generally on elevated sites, to which the spectator would look up; as much of the roof would be hidden by the eaves; and, finally, that nothing which really was required in carrying out the religious notions would convey the idea of ugliness. My use of these observations is obvious: if Bassæ was a hypæthral temple, here are the open tiles which *formed the hypæthrum*: if these gave a sufficient amount of open air in that temple, let me imagine that such was enough for any hypæthral temple: if the statues must be protected from casual rains the open tiles

could have had a transparent cover, such as lapis specularis. Furthermore, let me contend that the notch in the ridge is intolerable, that it would be seen in very many cases from a slight distance, and that the Greeks have at least the reputation of having been in the habit of decorating their construction in a most seemly manner, such as is evidenced by the remains at Bassæ.

And with regard to this decoration in a seemly manner, let me be allowed here a short digression upon two points of that subject of decoration which have occurred to me even since the last meeting of the Institute. It will appear from the diagram now submitted, that the rafters which carry the open tiles (let me say the hypæthral tiles) would be visible unless there were ceilings under them; and if the rafters were of timber, they would have required, as some think, to be richly painted. By Pliny the following dates are furnished. Pheidias died 432 B. C., a little after the date of the earliest encaustic painters whose names remain. Ictinus built the temple at Bassæ about 430 B. C.; it was not till about 382 that Brietes introduced the decoration of coffers in a ceiling with paint, "*lacunaria primus pingere instituit, nec cameras ante eum taliter adornari mos fuit,*" and Pausias, the great encaustic painter, was contemporary with Praxiteles, about 364-349 B. C. Secondly, with regard to the preservation or even the decoration of the statues by a '*circumlitio*,' that all deductions from the celebrated anecdote about Praxiteles expressing a preference for those of the statues which had received a circumlitio from the hands of Nicias are wrong, so far as they suppose that the circumlitio was a great addition because given by the hands of the celebrated painter Nicias. A careful investigation shows that Pausanias and Plutarch fix the epoch of this painter at about 322 B. C., making him one if not two generations younger than Praxiteles; and it is hardly to be supposed that the great sculptor would have thought his work improved by the handling of a youth whom we may call the painter Nicias 2, supposing that Nicias 1 was the favourite *polisher* employed by the sculptor.

In conclusion, it will appear that if there is any novelty combined with utility, in this matter of hypæthral tiles, no small thanks must be given to the system adopted in the case of the Dictionary: if anything that has been presented to your attention in this paper has been founded on sound principles, it would not probably for a long while have been taken into consideration, except under the pressure of that careful revision which each article receives. It is not intended to enter into any consideration of the number of such perforated tiles in each course; the quantity required by the temple of Apollo near Phigaleia, would depend upon various points, viz. whether the naos was ceiled or hypæthral; and whether the statue was in the cella behind the Corinthian columns: also, if the latter were the case, whether the open tiles were used on both slopes of the roof, or on one slope; and in the latter event, whether they were put on one side over the statue, or on the opposite side, it being assumed that the statue faced that eastern or side doorway, of which the existence was indubitable although Lenormant and Blouet had missed seeing its remains. The novelty of this view of one mode of forming the hypæthrum will be evident to those who can see, in the admission of the existence of such tiles, used as a hipped or a gabled roof with a gutter within parapet walls, a proof of the intention of the little attic shown in the tombs, figs. 4 and 10; a refutation of the dictum, that no temples were hypæthral unless they were decastyle with double peristyles, expressed by Wilkins in his '*Prolusiones*,' p. 96; and also a reply to great part of the usual arguments about the admission of light and weather into the ancient temples that were not lighted by such windows as those at the Erechtheium: the latter method scarcely seems to have been sufficiently considered hitherto by archaeologists, who should be prepared to find that this detail of the subject also offers some inducement to investigation.

Some architects may be inclined to think that, under the peculiar method of lighting here introduced to notice, there could not have been at Bassæ any such great space as is assumed to have existed between the tiles and the ceiling of the Heraeum at Olympia: because the omission of the soffits of the

corresponding coffers of a ceiling fixed far below the open tiles, would hardly be sufficient to indicate the presence of this apology for a hypæthral opening; while, unless there were such rimmed covers as above suggested, the open tiles would admit water enough to flood the back of the ceiling during heavy rains. The importance of the subject will not be lessened by the fact that it may involve the question of construction and decoration under the tiles. If it should be held that the underside of the tiles did form the ceiling, and if the carriage of the tiles upon timber rafters should be thought an objection on account of the incongruity of wood and stone in a splendid interior, it will be desirable to remember, that there were solid marble beams 18 ft. clear in the propylæa at Athens; and that there were actually hollowed marble beams 13 ft. in the clear in the north portico of the temple near Phigaleia, whereas marble rafters to that structure would only be 11 ft. 6 in. in length.

It will be a matter of pleasure to the Institute to know that since these remarks were prepared, indeed, only on Saturday afternoon, our Fellow, Mr. F. P. Cockerell, has been so obliging as to place in my hands the memoranda made by Baron Haller for Professor Cockerell of the researches at Bassæ. The limited time I could give to these sketches has proved to me three things—that my restoration was founded upon a correct supposition, for a fragment, fig. 28, is shown with the double turn that proves the existence of an independent opening in a tile: secondly, that my restoration was to a slight extent too much in conformity with the other tiles, because the dimensions to the fragments, figs. 22 and 28, show the great probability that two hypæthral tiles, and one to make up in length, ranged with two of the usual tiles employed in the structure in question, the widths being the same of all the tiles: and thirdly, that the neatly drawn representation (fig. 20) given in Mr. Cockerell's 'Bassæ' either preserves the memory of a third fragment, or, if intended to repeat fig. 22 was not perfectly like it; it must be confessed that if this fig. 20 was intended to repeat fig. 22, the underside of the fragment (as indicated in fig. 25) fully justifies Mr. Cockerell's consideration that it was the bottom of an opening.

It should be observed that the figs. 12 and 21 to 30, which Mr. Cockerell is so kind as to allow to be copied, are accompanied by the following remarks (which are given here, as they stand in the original, equally exactly with the figs. 21 to 30) from the pen of Baron Haller: "*Je ne pouvois pas encore prendre une idée probable ou cette sorte de tuiles particuliere devoit avoir ete employé: peut-etre qu'ils sont en correspondance avec l'hypethre: les fragmens signés H j'ai trouvé dans l'intérieure à la porte qui conduit du peristyle dans la seconde partie de la cella, cependant je n'ai pas rencontré d'autres que seulement ces deux exemplaires dans toute la fouille du temple.*" In fig. 18 are shown the ordinary tiles which are represented in figs. 15 and 16 as pierced; and fig. 19 is their section: fig. 14 is an attempt to combine the two fragments, figs. 22 and 28, with the ordinary tiles; but difficulties exist greater than those which are evident in figs. 17 and 18, which correspond to them.

These hypæthral tiles *must be later*, in my opinion, than the contrivance which Mr. Cockerell thought was indicated by the curb stones that, as given by him, pl. vi, figs. 4, 5, and 6, of his 'Ægina,' present discrepancies which have hitherto defied all attempts at making them suitable to each other, or to the rest of the work of the roof, unless they formed the border of such a pit in the sides of the roof as is indicated by the Cretan tomb. Most architects would agree in the conclusion that these hypæthral tiles were decidedly superior, in all ways, to the schemes requiring the curbs, and pits, and notches, hitherto put forward. No slight portion of my gratification at this public notice of the employment of open tiles in the roof of an ancient temple, will be derived from the permission to bring it before this Institute upon an occasion which draws together so many of the architects that, like him who has received their compliments, congratulations, and goodwishes this evening, have studied the existing remains of structures which furnish the facts for founding theories respecting the solution of the question—How was a hypæthral temple covered?

PROFESSOR DONALDSON, Past President, said he should be happy to give some opinion, but the truth was he had considered the hypæthrum, or *sub dio*, as being a curious, but not very profitable, subject, because there was so much doubt and such scanty information on the whole subject, that he had never been able to arrive at a satisfactory conclusion. He did not see at the temple such a tile as Mr. Papworth alluded to, although Mr. Jenkins, Mr. Wolfe, and himself measured all the remains *in situ* most carefully. It might have existed originally, and might have been removed subsequently; but it seemed to him it was an inadequate explanation of the terms hypæthral and *sub dio*, to consider that a temple should be covered with perforated tiles, and then such a mode of admitting the light was most insufficient. If there were great objections to having a break in the ridge line of the roof, the attic might be carried up over the internal columns without difficulty, which might afford a satisfactory solution on that point. In such a climate it was not necessary that the inside of the temple should be closed in, for they found by the buildings at Pompeii, that the atrium, or first court of the houses, was an open one, and exposed to all the varieties of weather and seasons; and if this had been prejudicial, it would not have been prevalent. The principal statue in the temple, such as the chryselephantine ones of Minerva and Jupiter, might have been covered with a canopy to protect it from the weather; and Pausanias mentions that in the temple of Jupiter Olympius damp upon the floor was prevented from injuring the statue by oil placed on the marble slabs; while in the Parthenon, on the contrary, water was placed on the floor near the pedestal of the statue to prevent its injury by the dryness of the rocky soil. Then inside the Parthenon there was a step two or three inches high, where the inside peristylum went round the cella, which would show that, as in the inside of the courts at Pompeii, it was to get rid of the wet in the impluvium of the court, and prevent it going over to the side. But there were so many difficulties round the subject that, although he had bestowed much attention to clear up this question of the hypæthral arrangement of temples, his only conclusion was, that it might have been an open court clear up to the sky, and could not have been lighted by mere tiles, and that the portion over the statue of the deity might have been covered in by a continued roof, or by an awning (*velarium*), to protect it from the weather. He had great respect for the investigations of Mr. Papworth, but the evidences were so slight and unsatisfactory, that it was impossible to arrive at a safe conclusion upon this very vexed subject. They were much indebted to Mr. Papworth for having undertaken various difficult subjects of architectural research, and he begged to propose a vote of thanks to him for his suggestive and very interesting paper: no man was more competent than he to illustrate this subject, either from the monuments, or by his literary researches relating to ancient architecture. He had no doubt whatever as to the door, which Mr. Papworth alluded to, the dimensions of which were clearly taken, but it was very unusual to have a doorway from the cella to the peristylum.

Mr. C. C. NELSON, V.P., Hon. Sec. For. Cor., asked what was the height of the doorway which Messrs. Lenormant and Blouet had failed to perceive.

PROFESSOR DONALDSON replied, that the wall remained about three or four feet high from the surface. The views showed about four or five feet in various parts.

Mr. NELSON begged to second the vote of thanks to Mr. Papworth, who had taken great pains with the subject. Having himself been a little behind the scenes, he was anxious to hear the *dénouement*. The drawing of Baron Haller clearly showed the return of the tile, unless it was only a work of the imagination. There was the fragment of tile returned at the ends, showing that it was a perforated tile.

Mr. THOMAS MORRIS, Associate, remarked that the late Mr. Wilkins's opinion was corroborative of that of Professor Donaldson. In the Glossary to Wilkins's translation of Vitruvius it was stated that hypæthral temples consisted of three aisles; the two outside roofed, and the middle one open to the sky.*

* "*Hypæthral*. A temple whose cella was in part exposed to the air. These temples had a double range of columns within the cella, dividing it into three *alæ*, or *aisles*. The *alæ* on either side were roofed, but that in the middle had no covering. The term is derived from *ὑπαθρος*, signifying, open to the sky."

When they considered the climate of Greece, it was likely that they (the Greeks) would be as glad to admit the air freely into their temples† as the Pompeians were to have it in the midst of their houses. In our own Royal Exchange the central portion was open, though we have a comparatively severe climate; and it was the same with the Corn Exchange, in Mark Lane, which originally had roofed porticoes at the sides, just like a hypæthral temple. The central part received its covering (from his design) about twenty years ago only.

Mr. PAPWORTH replied that he was happy to have brought before the Institute any matter which tended in some way to clear up the difficulties which, as Mr. Donaldson truly stated, subsisted with regard to the nature and even to the existence of the hypæthrum. He thought that the words of Varro respecting the *dius Fidius*, viz., "*itaque inde ejus perforatum tectum ut videatur divum id est cœlum*," were directly in favour of the suggestion that these open tiles might have been used in Italy as well as in Greece; that even a single tile of this kind would fulfil those of Ovid, viz., "*exiguum templi tecta foramen habent*;" and that, with a couple of them placed one on each side of the ridge, it might be said with Servius, "*suprema pars tacti patet*." He left to other critics the task of distinguishing what Vitruvius meant by "*jovi fulguri et cœlo et soli et lunæ ædificia sub divo hypæthraque constituentur*," because he had a strong impression that the hypæthral class of temples indicated by that author were almost hypothetical, in fact, that Vitruvius was describing the existing condition of the decastyle temples to Apollo Didymæus near Miletus, and to Jupiter Olympius at Athens, neither of which had their roofing completed at the time when his compilation was made, and fell into the error of supposing that these were the models for all similar structures having as many columns. If the addition of *Fidius* and *Terminus*, to the list just given, completed the number of deities who had hypæthral temples, the names were very few. It would be fair to recall to the minds of Mr. Donaldson and Mr. Morris the cataracts of rain, and the inclemency of equinoctial storms and wintry gales which, in sunny Greece, had almost prevented even English travellers from prosecuting a journey. Of course he (Mr. Papworth) was aware that the allusion to the temple at Athens involved him in an obligation to account for the very doubtful text of Vitruvius, "*hujus autem exemplar Romæ non est sed Athenis*," by adding "*in astu Jovis in templo Olympii*" as a conjectural reading that was preferable in his opinion to "*decastylos est in templo Olympii*." The usual reading "*octastylos et in templo Olympio*" had done great damage by leading people to infer that the Parthenon had an open centre: no ancient opening in the roof of the cella was mentioned by modern visitors before the explosion; they noticed that the building was dark, and that parts of the marble tiles, having fallen, were kept in the building: this disposed of the idea that the other two-storied temples at Ægina, Eleusis, Ephesus, Olympia, Pæstum, and Tegea were necessarily hypæthral in the sense of having an open well in the roof over the cella. Indeed Eleusis is supposed to have been capable of having the light shut out; Ephesus had a cedar roof; Olympia and Tegea were roofed; and there only remain Ægina and Pæstum to be explained: either might have had wells in the slopes of the roofs, or have had an attic, as in fig. 11, in which some open tiles might have been employed. There is no evidence that the temple at Bassæ or the Parthenon had open centres; open tiles must be accepted in one case, and may be presumed in the other: and he (Mr. Papworth) imagined that some day it would be found that translucent or transparent tiles had been more commonly employed than had hitherto been supposed.

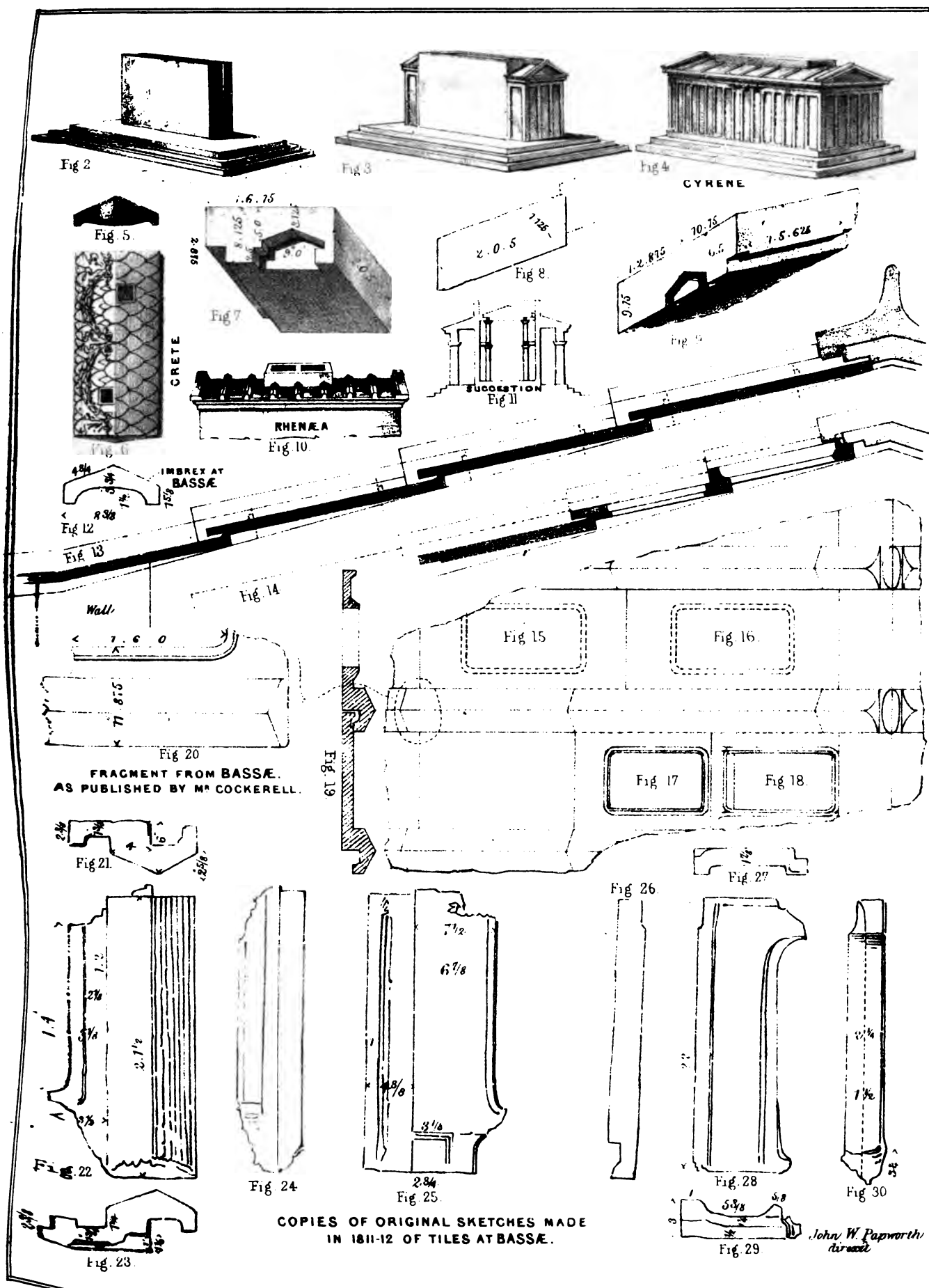
The best thanks of the meeting for this very interesting paper were unanimously voted to the author; and the meeting adjourned.

SUGGESTIONS RESPECTING THE ROOFS OF TEMPLES CALLED HYPETHRAL,
AT ÆGINA AND BASSÆ.

EXPLANATION OF DIAGRAMS.

- Fig. 2 Reduction of fig. 4 to the condition of being without roof and doors in illustration of Pausanias.
- „ 3 The same, with the addition of roofed porches.
- „ 4 Tomb at Cyrene; as drawn by Mr. Beechey.
- „ 5 and 6 ... Cover, of a tomb from Crete now in the British Museum, about 7 ft. 6 in. long by 3 ft. 2 in. wide, and 11½ in. thick; the hole in front is 6½ in. by 7½ in. and 14 in. from the edge, that at back is 7½ in. square and 17 in. from the edge; both have a ½ in. rebate ¼ in. deep in addition.
- „ 7, 8, and 9. Portions of *curb* found at Ægina; as drawn by Mr. Cockerell; probably suiting a wall placed not so near the ridge as in fig. 6.
- „ 10 Upper part of a tomb, at Rhenæa near Delos, about 5 ft. 5 in. long by 2 ft. 10 in. wide; from Mr. Kinnard; the cross wall is remarkable.
- „ 11 Suggested position of attic walls, at temples having two stories of columns inside, suitable to a *cavædium* whether corinthium, tetrastylon, or *displuviatum*, as well as to the *atrium testudinatum* here shown by dotted lines as if roofed with open tiles.
- „ 12 *Imbrex*, or tile covering joints, found at Bassæ: its place has not been determined, and its variation from the other *imbrices* seems to indicate that there were two sorts of tiling.
- „ 13 Section of the ordinary marble tiling at Bassæ.
- „ 14 Section showing an attempt to employ the fragments figs. 22 and 28 in combination with the other tiling; but this is subject to the remarks concerning fig. 12.
- „ 15 and 16... Plan of two ordinary marble tiles at Bassæ; the dotted lines represent openings suggested by fig. 20.
- „ 17 and 18... Plan showing a restoration of the fragments fig. 22 and 28 with the needful length of a short tile; but this also is subject to the remarks concerning fig. 12.
- „ 19..... Section of an ordinary marble tile, as used at Bassæ, and of fig. 15.
- „ 20..... Fragment of a marble tile found at Bassæ, as drawn by Mr. Cockerell.
- „ 21 and 23... Sections of a marble tile (fig. 24) found at Bassæ, as drawn by Baron Haller, with the breast, fig. 22, back, fig. 25, and face on side of return, fig. 24.
- „ 27 and 29... Sections of another marble tile (fig. 28) found at Bassæ, as drawn by Baron Haller, with views of the sides figs. 26 and 30.

SUGGESTIONS RESPECTING THE ROOFS OF TEMPLES, CALLED HYPÆTHRAL, AT ÆGINA AND BASSÆ.



COPIES OF ORIGINAL SKETCHES MADE
IN 1811-12 OF TILES AT BASSÆ.

ACCOUNT OF THE RESTORATION OF THE DUTCH CHURCH,
AUSTIN FRIARS,

Principally from Notes by the late WILLIAM LIGHTLY, Fellow,

By EDWARD T'ANSON, Fellow.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, January 29th, 1866.

THE church of Austin Friars, near Old Broad Street, in the City of London, was founded in 1253 by Humphrey Bohun, Earl of Essex and Hereford, surnamed the Good.

Records are existing of grants of land and other property made to the church in the years 1299, 1321, 1363, 1373, and 1394. The style and arrangement of the first church of 1253 probably bore a close resemblance to the rectangular part of the Temple Church, which was erected just previously; that is to say, it consisted of a broad nave and side aisles of unusual width, forming three gables at the west end, and was lighted by triple lancet windows in each bay of the side aisles.

Another Humphrey Bohun, Earl of Essex and Hereford, grandson of the founder, rebuilt the church in 1354, and the window tracery and those parts of the walls and buttresses where the bands of flint-work still remain belong, I believe, to this rebuilding; and that there must have been another and later rebuilding, though no record of it exists, is very evident; for the window jambs and arches, and the nave arcades are clearly of a much later date, and lead to the conclusion that this later rebuilding of the church was about the end of the fifteenth century.

Until the Reformation this church, with the monastic buildings appertaining to it, belonged to the Augustine Friars. On the 12th of November, 1539, Thomas Hammond, the last prior, and twelve of his canons surrendered the monastery to Henry VIII. It was valued at £57. In 1540 the king granted to Sir Thomas Wriothesly the great house or messuage within the site and precinct of the late house of Austin Friars, and in the following year gave other portions to Sir W. Paulet, Lord St. John, and Sir Richard Rider, and on the 22nd July, 1550, Edward VI. granted to the same Lord St. John, afterwards Earl of Wiltshire and Marquis of Winchester, all the upper part of the church, the choir, transept, and chapels. His lordship converted the transept into a place for the stowage of corn, and of the choir he made his coal house. The next Marquis stripped the lead off the roof, and sold the monuments, paving stones, and other moveable portions of the building for the sum of £100., and on the site of the house, cloisters, and gardens he erected the large mansion known as Winchester House.

The church and convent, as rebuilt in 1354, must have been of considerable extent, for the buildings and grounds extended from Broad Street northward to London Wall, and from the north corner of Broad Street to the church of St. Peter-le-Poor. The church consisted of nave, north and south aisles, north and south transepts, south porch, choir, chapels of St. John, St. Mark, St. James, St. Thomas, chapter house, and cloister, which last appears to have been on the north side of the church; the churchyard was on the south side. At the intersection of the cross there was a spire or fleche, which was regarded as one of the remarkable objects of London; for Stowe, writing in 1593, says, "The church is a large thing, having a most fine spiral steeple, small, high, and straight; I have not seen the like." This small spiral steeple was overthrown by a tempest of wind in the year 1362, but was forthwith raised again. It so remained until the end of the sixteenth century, when it became dangerous; for we find that the Lord Mayor and citizens, writing to the Marquis of Winchester, to whom the property then belonged, on the 4th August, 1600, requesting him to restore the steeple, as it appears

he had promised to do, and threatening legal proceedings if he did not; but promises and threats appear to have been alike unavailing, so the steeple with the east part of the church was taken down, and, says Stowe, "houses for one man's commodity raised in the place, whereof London hath lost so goodly an ornament, and times hereafter may more talk of it.

As to the part of the church which was westward of the transepts, and which still remains to us, we find that Edward VI. in his Diary has the following minute: "29th of June it was appointed that the Germans should have the Austin Friars for their church, *in purum et liberam elemosynam*, to have their service in for avoiding of all sects of Anabaptists, and such like." It was thenceforth called the Temple of Jesus, and some glass quarries, which at the late restoration were preserved from the old windows, bear the legend of Jesus Temple, are dated 1550; two others bear the legend, Temple of the Lord Jesus; these were all replaced in the two windows at east end of the north and south aisles. From the date of the first minister, John a Lasco, in 1550, to the present time this church has remained in the hands of the Dutch, and has been managed by consecutive elders of that church to the present time. The sequence of the ministers, from the date of the first appointed up to the appointment of the present minister, Dr. Hendrick Gehle in 1830, is recorded by a tablet in the church. As the church existed within the last twenty years, it will be remembered by all who frequented the busy purlieus of Threadneedle Street and Broad Street, in a retired thoroughfare, hemmed in by the houses of London merchants, which within the last few years have been converted into offices.

The west front of the building, together with part of the north aisle, were the most conspicuous; the other portions being surrounded by buildings. Its large west window, not remarkably good in character, and its decorated aisle windows, formed one of the most noticeable remnants of mediæval architecture which the City contained. The exterior had been carefully repaired about 1828, but owing to the want of knowledge which prevailed on this subject in the early part of the century, not in the careful manner which characterises restorations of the present day. It was, however, then a matter of comment, and the subject was warmly discussed in the 'Gentleman's Magazine' of that date.

The old water tables of the buttresses appear to have been removed, and the decaying mullions and tracery,—chiefly of Reigate fire-stone, and much perished,—were restored with Roman cement, and the surface of the walls rendered over with the same material, whereby nearly the whole of the old work was covered up. Over the west door a canopy appears to have been added. Some further restorations were in progress in the year 1862, when a fire destroyed a large portion of the work, and left the building in a condition which appeared ruinous. Nearly the whole of the roofs of the north aisle and nave were destroyed, and the upper parts of the masonry much injured, but fortunately the tie beams of the nave were left remaining, although damaged. After the fire the building was surveyed by the Fire Office Surveyors, who considered it past repair, and such was also the opinion of the District Surveyor, who officially condemned it as a ruinous building.

At this time I was professionally consulted. I found the building in the state I have partially described. The pillars on the south side of the aisle were not only as much as 17 inches out of the perpendicular, but the whole church had taken a southward settlement. On plan at the level of the top of the walls having assumed a bow form, gradually increasing towards the middle, where on the north side of the south aisle the versed line of the arc was, and still is, 17". On the north side of the aisle it was somewhat less, and on the inside of the external walls of the north and south aisles it was less still; the external walls having suffered the least movement, especially the wall on the north side.

Having reference to the extremely dilapidated, and, as it appeared to me, ruinous condition of the church—to the very great value of the land in Austin Friars—to the inconvenient size of the church for the purposes to which it was required, its size being utterly disproportionate to the requirements of

its congregation,—I came to the conclusion that it would be in all respects more desirable to pull down the existing,—as it appeared,—ruinous fabric, the restoration of which would necessarily be very costly, and to build another church more suitable to the requirements of the congregation. I accordingly so advised the trustees; but being desirous not wholly to lose the tradition of the ancient church, I proposed the erection of a building of mediæval architecture, and engaged the services of my late esteemed friend and pupil William Lightly, who had long worked with me in other matters, to co-operate with me in preparing a design for the proposed new church. This was accordingly done; when it having become known that it was the intention of the trustees to remove the old building, so strong a manifestation of public feeling was evinced by letter in the daily papers of July, 1863, and very influential and pressing representations made to the minister and elders of the church, that the trustees were led to reconsider the question. Although I still held unaltered my views as to the practical utility of erecting a building more consonant with the requirements of the congregation, I felt there was no absolute impossibility in preserving the work as it stood, and in effecting a restoration. The committee of the Dutch Church feeling that they were trustees not only to a limited congregation but to the general public, who they believed, by the strong expression of opinions which were made, were seriously desirous of retaining the old church, resolved in deference to the opinions so expressed to abandon their original intention, and, if practicable, to restore the church. I therefore, in conjunction with my late friend Mr. Lightly, undertook the task of retaining and repairing the existing portions of the church, and of restoring such portions as were destroyed. Having once come to that determination, we endeavoured conscientiously to restore the building as it stood, retaining every part of the ancient fabric, uncovering and restoring such portions as were hidden and masked by the work of the seventeenth century and later times.

One of the plans exhibited shows the arrangement of the church as we found it. At the west end were vestries, an organ loft, and a library. The general arrangement was picturesque, but of the worst character of the seventeenth century. The lower part of the stone piers was lined with wainscoating, as also the external walls. The altar table was raised on a platform enclosed with a wooden balustrade, with wall linings at the back of a more ornamental character; all of the work of the end of the seventeenth or beginning of the eighteenth century. The altar was decorated by a painting representing an arcade of the Ionic order, containing the Creed and Commandments. On entering on the work we recommended the entire removal of the vestries, organ loft, and libraries, which entirely filled up the western bay of the church, the wall linings, and the altar decorations; and we proposed to remove the vestries to the east end adjoining the altar, one of which is used by the minister, and the other by the elders of the church; keeping the vestries low, so as not to interfere with the building or to abridge its apparent size. We also proposed the removal of the south porch (which was not without its picturesque aspect), and to replace it by a doorway more in accordance with the style of the church; for this we had no precedent, and it is strictly an addition. We also recommended the enclosing by wooden screens of the bays at the east end of the church, which affords ample space for the congregation; and we recommended the decoration of the broad wall space at the east end by a fresco painting, but this being inconsistent with the service of the church was not carried out, nor were we allowed, (as was also suggested), to use any coloured glass for the windows. After the resolution which the trustees came to at the end of July, 1863, to restore the ancient building, and certain arrangements necessary in consequence of the altered plans, some time necessarily elapsed before contracts could be obtained for the restoration, and it was therefore not until October of that year that the tenders were received and the work was actually commenced.

Seeing the extremely critical condition of the piers of the arcades, our first attention was directed to an

examination of the foundations of this part of the building. We therefore had the substructure of the piers exposed, and found that they rested on brickwork, having apparently been underpinned, and that the foundations were perfectly sound and sufficient. Having fully satisfied ourselves on this point, we resolved to retain the walls and arcades out of the upright as we found them, deeming it, in fact, impracticable to effect any alteration in this respect short of rebuilding the whole, and to put on the new roof without rebuilding them. The old vestries, library, and organ loft, which disfigured the western end of the church, having been removed, the first step was to shore up the old walls and place strutted shores between the arcade walls, and the walls of the nave and the aisle walls, and then to make good all the unsound parts of the walls and arcades which were in a defective state.

It was resolved to retain the flat over the south aisle, which was little injured, and the plaster and ceiling which concealed it internally was removed. This roof was constructed with very imperfectly trussed principals, and some which had no bearing on the south wall were removed and new ones introduced, with a proper bearing on the south side, and made to run completely through the arcade wall of the nave. The old king posts and braces were re-framed, and the spaces filled in with pierced panelling. This work was necessarily done with great care and caution, one truss only being removed at a time. The old timbers were then wrought as they stood, and new boarding was added on the under side of the rafters. A new flat, corresponding with this, was then placed on the north aisle, the tie beams being carried through the arcade wall as described above. Three of the six tie beams of the nave roof, though they remained in their places, were found on a close examination to be completely burnt through at the ends; and the wall plates, which were large pieces of timber, were found to be in many places so much decayed that it was necessary to replace them, and the great size and weight of the timbers to be moved on the top of the injured overhanging walls, and the removal and substitution of new tie beams, caused some anxiety. Eventually, however, this was accomplished, and new plates and tie beams were inserted and framed, by means of wall pins and braces, to the tie beams of the aisle roofs, which had been previously brought through the walls, and a strong king post truss formed on each tie beam, the whole firmly bound together by strong wrought iron straps, uniting the tie beams of the nave with the principal rafter of the aisle roofs.

Six large dormer windows were introduced as a sort of clerestory at the east end, as but little light could be got at that part of the church, being the part where the service is performed, owing to the adjoining buildings having been brought close up to the walls.

On the outside the roofs are covered with rough boards, felt and slates, on the inside with white deal, formed into panels by mouldings, to cover the intersections and joints, and a moulded and embattled cornice fixed on the face of the wall plates. The whole of the internal boarding is varnished without any stain.

The building having been thus covered in, the shores, by which the arcade and external walls had been sustained whilst the roof was being re-formed, were struck, and though the walls and piers have been carefully watched, no further settlement or movement has been detected.

The internal masonry was now cleaned, and the chalk facing re-pointed. The tracery of the windows, which it was intended to retain, on examination proved to be impracticable, for all mouldings of the windows had been chipped off, nails driven into the joints of the mullions, round which twine had been twisted, and the mouldings run in cement. The tracery also was so much defaced, and so injured by decay, that it was found necessary to restore the whole, which has accordingly been done, and a careful and faithful restoration made in Portland stone. The old tracery was of several kinds of stone, principally Aubigny and fire stone. The graves with which the area of the church was covered, and of which many had been burst in by the falling of the roof timbers at the fire, were filled with concrete,

and the stone paving re-laid, care being taken to retain every old stone, including those in which brasses had been inserted, of which there is a goodly number, principally of Purbeck marble, but every brass had disappeared.

The eastern part of the church is now enclosed by an oak screen, and the pulpit, organ case, and seats required for the congregation, are constructed with oak.

The east wall of the church now demands our attention; this was originally the arcade between the nave and the transept. Previously to the present restoration it was concealed by a plaster screen before referred to, on which was painted the Creed and Commandments, and behind this, on its removal, was found another lath and plaster construction, painted with a curious perspective interior. The removal of these screens revealed to us the construction of the east end, from which it would appear that the great arch which partly supported the steeple or fleche had failed, and that another inner arch and piers had been added beneath it. This was probably done when the spire was rebuilt, after it was thrown down in 1362. This inner arch we completely unmasked, and restored as much of it as is left uncovered by the brick wall, by which the east end of the church is enclosed.

Externally, two only of the bays on the south side have been re-faced with Kentish rag stone, all the rest remain covered with plaster.

No variation has been made in the form of the church except the removal of the old porch on the south side externally, and the substitution of another porch. With the view of obtaining light to the enclosed part of the church, six dormer windows have been formed in the roof. To both of these additions I have before alluded.

Since the restoration of the church was commenced, a large area of ground has been excavated on the south of the church, towards the east of the present building, just at the point where traces of the former transept may have been expected to have been found, but no indications whatever of any former building has been met with.

At the east end, adjoining the church, is a house belonging to our Fellow, Mr. Arthur Ashpitel, and there may still be seen in some recesses in this house the arch mouldings on the east side of the arch which now terminates the church at its eastern end.

To a great extent I have in the preceding notes followed the memoranda which was left by my deceased coadjutor, to whose ability in conducting the works, and of whose unceasing interest in it whilst he still lived, I am glad of this opportunity of recording, and also of my own deep regret that so promising a member of our body should have been so prematurely taken from us.

Allusion is made in Mr. Lightly's remarks to the similarity between the Temple Church and the Austin Friars Church, and to the one having been built shortly after the other, but if I am right the Temple Church was built nearly a century earlier. The size of the two churches is very different, the Temple Church, between the walls, being 58 ft. by 82, whilst the Dutch Church is 80 ft. by 150. The former has also only five arcades, whilst the latter has nine. The height of Austin Friars Church to the under side of the tie beams is 40 ft.

In resumé, I have only to add that the works of restoration were begun late in the autumn of 1863, and the church was opened for public services in September of last year—1865. The total cost of the work executed will not be less than £11,000. There still remains portions of the external masonry, and particularly the west front and some of the buttresses on the south side, which require restoring and part rebuilding. It is the intention of the Committee gradually to complete the work they have begun, so that it will be seen they have responded cordially to the opinion so warmly expressed, calling for the preservation of the ancient church. The work has cost

already as much as would have sufficed for a new building; the outlay is not yet completed, and the sacrifice in value of land, which might have been otherwise appropriated, is at least equal to, if not more, than the cost of the works. Now this monument, which contains the mortal remains of some royal and many illustrious men, and which from its large size alone entitles it to be called a noble building, will probably remain for generations to come a record of former generations—of those times when large monastic establishments occupied a site now densely covered with houses devoted to the purposes of trade and commerce—and of the truly conservative spirit of the present guardians of the church, who, at no small sacrifice, have preserved the ancient church of Austin Friars.

Mr. BENJAMIN FERREY, Fellow, rose to propose a vote of thanks to Mr. I'Anson for the interesting paper he had favoured them with. It was interesting in many respects, and particularly because it described to them the state of one of a class of buildings, of which very few now remained in the metropolis. So many of them were destroyed, that they ought to be very thankful for those which still remained, and he trusted they might be preserved to them. With regard to the ancient form of the church of Austin Friars, they had little to refer to besides the nave, and nothing could be said upon it beyond what had been stated by Mr. I'Anson, and they must feel thankful to that gentleman for having been the means of preserving to them so much as remains of this ancient monument of mediæval architecture. He (Mr. Ferrey) remembered inspecting this church in company with some archaeological friends, and he was struck with the simplicity and grandeur of its proportions. At that time there was a vehement desire to destroy it, and build in its place a smaller structure, they were therefore indebted to Mr. I'Anson for yielding his own opinions to those which were in favour of its preservation. There were no unusual features about the church: it had simply some of the grand proportions of the churches of that period. They had to thank Mr. I'Anson very much for having presented them with so interesting an account of its early history, and for having been the means of restoring it to the state in which they now saw it. He therefore proposed that their best thanks be accorded to Mr. I'Anson for his paper. The author of the paper, had alluded to the arcade being much out of the perpendicular. He could quote many examples, if needed, where the columns were considerably out of the upright, without danger to their security. He particularly referred to the Church of St. John, at Devizes. Anyone on entering that Church would be oppressed with a sense of real danger, and yet it had been in that position, with its arcade marvellously out of the upright, for upwards of a century. The mere fact that the columns of a church might be out of the perpendicular, was alone no proof of danger; they must look at the other elements of weakness or strength. In the Church of Austin Friars he could say, when he entered it he saw no danger, and Mr. I'Anson had told them that the foundations were not in a condition to lead to the idea of danger; therefore he thought, in this instance, it was a most happy circumstance that they had so judicious and astute a friend as Mr. I'Anson, who had secured that building to them, instead of permitting it to be pulled down, as otherwise must have been the case.

Mr. EDMUND WOODTHORPE, Fellow, said, as he was the district surveyor who condemned this church, he might appropriately second the vote of thanks to Mr. I'Anson. He had great love for mediæval art, and ancient art of any kind; but in the case of this structure, the clustered columns and walls were so fearfully out of the upright that he could not, as a public officer, allow them to remain in that state till some security had been given him that, in the event of an accident and any lives being sacrificed, he might be protected from the verdict which a capricious jury might return. If the members looked at the section exhibited, they would see that he was borne out in the condemnation which he passed upon it. At the same time, when he went into the examination of the foundations of the clustered columns, external walls and buttresses, he could see no objection to them, provided his friend

could obtain the certificate of some eminent church architects, to screen him from the wild verdicts which juries sometimes recorded. He had great pleasure in seconding the vote of thanks, and he thought they had had preserved to them a good monument of that date, although he must say he was not so ardent an admirer of the beauties of the structure as some.

Mr. ALFRED STRONG, Associate, remarked, that in the case of a church in France, which was about to be appropriated to the secular purposes of a riding school, the walls were considerably out of perpendicular, and bulged outwards. The way in which they were brought up was by using iron tie-rods, fitted at both ends with nuts and screws, and plates. In the absence of gas, rows of lamps were suspended beneath the rods, causing them to expand with the heat. As this expansion increased, the screws on the outside of the walls were turned, and this was done simultaneously and so gradually to each rod that the walls were brought into the perpendicular again, and were now standing in that position.

Mr. JOHN W. PAPWORTH, Fellow, said, that the meeting must be very much obliged to Mr. l'Anson for making it acquainted with his success in keeping up arcades, which, according to the section shown, beetled so much as 17 inches in 39 feet. It would be very interesting to enquire into the causes of this varied action of overhanging work; the north aisle appeared to have beetled $2\frac{3}{4}$ inches in 31 feet; the north arcade $16\frac{3}{4}$ inches in 39 feet; the south arcade $17\frac{1}{2}$ inches in 39 feet; and the south aisle 8 inches in 33 feet 4 inches. He should be glad to hear of other instances of safety where such main portions of the building had gone out of the perpendicular. In a case of which he had been informed, the walls had beetled outwards about 14 inches, through the thrust of a very flat roof, and the buttresses of course went over with them. The persons engaged in restoring that church had taken out the foundations both of the buttresses and of the wall, and filled in 2 or 3 feet depth of concrete; but, remarkably enough, no one had thought what would happen if the wall itself was to be made upright, the result of which would be that a vacancy of about 14 inches would be left between the back of the secured buttress and the face of the restored wall. He mentioned this to show it was well to think twice before these works were described as successes. In reference to the case mentioned by Mr. Strong, he believed that heat was used in the operation of bringing walls upright which was carried out at Clapham Church, in Surrey, under the superintendence of his father, in 1829. He (Mr. Papworth) would be glad to hear whether, on the examination of the buttresses on the south side of the church, any under-pinning of them had been noticed.

Mr. l'ANSON, Fellow, replied, that he did not examine the under-pinning of the buttresses.

Mr. FERREY, Fellow, had not come prepared with a schedule of buildings with walls out of the upright, but he had no doubt he should be able to supply several instances. He thought the illustration now before them was a very good one.

Mr. WILLIAM WHITE, Fellow, mentioned an instance in which he had brought the walls of a church back to the perpendicular by the expansion and contraction of iron—(charcoal in boxes being employed for the heating)—which was all very well when the walls were properly secured by a tie-beam roof. There was one point which he thought had not been sufficiently noticed. He understood Mr. l'Anson to state, in the case of the Church of Austin Friars, that the walls had spread, not in the way Mr. Papworth spoke of, but they had followed each other to the south, which was different from the spreading of the upper part of the walls, because directly a heavy weight was put upon the walls, the tendency would be very great to throw them still further out of the upright, though this, of course, might be provided against by a sufficiency of abutment to support them. He knew a church in which one of the arcades of the nave beneath the old roof had gone to the south in the manner described. The north side had followed to a smaller extent. The foundations, especially on the south side, were

very bad, from its being on the slope of a hill, and a clay soil. The whole of this appeared to have gone downwards under the old roof, and about eighty years ago they rebuilt the clerestory upon that sloping arcade, with a good oak tie-beam roof, well braced and framed on to the corbels; but its tendency southwards was still so great, that during the eighty years that had elapsed it had been gradually going still further to this side, and over the chancel arch there were several settlements into which the hand could be introduced, and in a short time it would be down. But an attempt at supporting the arcade was made by putting struts from the points of the arches down on to the south wall. They felt, evidently, the insecurity of the sloping arcade, and they either put on these struts at that time, or else, perhaps, they left them there when they re-built the clerestory. But these struts were actually pushing out the aisle wall to such an extent, that it had drawn the first piece of the roof several inches from that wall. That was a case, without any doubt, for the drawing up of an arcade in the manner described, and he did not at all think it would be necessary to re-build the arcade, for the stone work was substantial, and the masonry was not too solid to resist the force of drawing; it was, however, solid enough to stand if it were pulled up, and the only way would be to get sufficient struts against the inside of the north arcade wall to keep it from going further southwards when the lateral tension was applied; for the north arcade plainly was already giving, since, apart from the indications named, there were also cracks in the spandrils of that arcade, which showed that it was gradually going. There was another point to which he did not think sufficient attention had been called, viz.—the grand spaciousness of the interior of the Church of the Austin Friars. This was well deserving attention, for it was in that respect a type of plan admirably fitted for congregational worship at the present day.

THE PRESIDENT, A. J. B. BERESFORD-HOPE, M.P., &c., said, they were much obliged to Mr. F'Anson for his paper, and for the discussion that had taken place upon it. He had listened to the paper with peculiar interest, for Austin Friar's Church was one which he looked upon, long before it had been burnt and restored, as a very beautiful and interesting monument of ancient conventual architecture. He, too, was himself one of that party who had met within its roofless walls to hold conference with those gentlemen who, so honourably to themselves, rescinded a determination to which they had seemed committed, when reason was shown to them why they should do so. Credit was also eminently due to Mr. F'Anson for the avowal of the part he had then taken, so manfully and so modestly made that evening. It was honourable to him that he should have been able so candidly to explain the course he took in such a way as to reconcile his former opinion with his present action. Connected with this work was the memory of one whom they all esteemed so highly and mourned so sincerely—the accomplished Mr. Lightly—and this recollection imparted a mournful interest to the restoration of Austin Friars. As to the grand spaciousness of the Church, he fully agreed. In the book which he wrote some few years ago on the English Cathedral of the Nineteenth Century, in which, to say the truth, he really dealt with the question of large town churches, making the idea of a "Cathedral" the point of departure, and the centre around which to group his thoughts, he had made especial reference to this Church of Austin Friars. It was his ideal of one of the two alternative types which he believed the town churches of our age ought to follow. He pleaded that they should not be the tiny structures which the middle ages of England had scattered over cities, like York and Chichester, but that they ought rather to aspire after the size and the dignity which often marked the town church of the Continent. Either like a large class of those Continental churches they ought to exhibit something of the Minster character—the character which we associate with cathedrals and abbeys, although found in England at S. Mary Redcliffe, at Newark and elsewhere—or they should follow that other type of large church, where breadth made up for height—churches of a single story, with wide naves, slender pillars and a large internal area. The Temple Church was an early adumbration

of this idea, and Austin Friars at a later date—larger though less ornate than the Temple Church—was a reproduction of the same model, with the substitution of wooden roof for groining. He had anticipated that Mr. Ferrey, connected as his name was with that great man, Pugin, would have remarked upon the fact, that beyond a doubt Austin Friars Church had helped to form the style of that eminent artist, for no one could see St. George's Church, in the Borough, without feeling that the mind of its architect was saturated, as it were, with Austin Friars, of which it was almost a re-production, with steeple and chancel added. Carpenter was another man who owned (as he happened to know) his obligations to Austin Friars Church, and in his Church of St. Mary Magdalene, in Munster Square, a strong recollection of that model was evident. Here was a proof that the building had not been fruitless in forming the modern style of ecclesiastical architecture, when two conspicuous edifices, which marked its earlier phase, had been modelled on it. This was an additional reason why it would have been a sore grief and pity if it had been allowed to be swept off the surface of the earth, in a day too, when the other large mediæval churches of the city, St. Bartholomew and St. Helen, were being restored.

The President then put the vote of thanks, which was unanimously passed.

NOTES ON A VISIT TO THE AUVERGNE CHURCHES.

BY EDWARD L'ANSON, Fellow.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, 29th January, 1866.

I DID not recollect when I proposed to mention the churches of Auvergne that the subject had already been spoken of in this room by Mr. Street. Referring to his paper I see that he has most ably described the character of these interesting buildings, but as I was not prepared under any circumstances to have entered at length into a description of the buildings, I have the less difficulty in offering the very few remarks which it occurred to me might help in filling up the evening.

I exhibit some unfinished and too hasty sketches of some of these buildings, and a plan and section of one of the churches which gives the form of all the Auvergne churches. What is particularly striking is, that throughout a certain district there is a most marked peculiarity and distinctive form, more exclusively and generally prevailing than in any district of which I am acquainted—less mixture of buildings of different styles and dates. There are other districts, such as Normandy and the neighbourhood of Perigeux, where there are very distinct styles prevailing, but there is more admixture in the same locality of buildings of different character, and so far as I recollect nowhere the same style is so exclusively used as in Auvergne. The style, too, although not so perfect as the Norman and some other provincial styles, is generally picturesque, and strikingly successful in the arrangement and grouping of the apsidal chapels, and it is also remarkable for the successful employment of the external mosaic work with which the exterior of all these churches is decorated.

The west fronts generally are remarkably plain. It is said that all of them had two western towers, but these have ceased to exist; and as at St. Etienne at Nevers, Notre Dame at Dijon, and even at Notre Dame of Paris the west front forms a mask to the building, and does not reveal by the gabled termination of the nave roof the general form of the church, as is commonly the case in our English cathedrals.

M. Mallay, a French author, who has published an account of the Auvergne churches, enumerates no less than eighty-four churches within a limited district which partake of the character of the church, (Notre Dame du Port Clermont), the plan and section of which is now before you. The date of these churches does not seem to be accurately determined, but it ranges from 1080 to 1200; and they are evidently nearly contemporaneous—a prevalence of the pointed arch in some showing the later date—but the same general character prevails throughout. They all have the nave covered with a barrel vault and aisles with quadripartite vaulting, without ribs, and as there is no clerestory the roofs are heavy and dark in appearance.

The chancel, or east ends with the radiating apsidal chapels, as may be inferred from the plan, produce the most pleasing effect both internally as well as externally; and under most of the churches there is a crypt at the eastern end. The churches in the principal towns have been recently restored, and it appears to me with great success. The roofs externally are crowned with a low ridge or cresting. All the ridges I saw were evidently restorations, and so classic in character, as to raise a considerable doubt as to the restoration being correct; the gabled crosses are also peculiar, and somewhat Byzantine in character. The capitals of the columns internally partake largely of the character of the classic Corinthian model, with strongly marked Byzantine character in the foliage, and very different from the contemporaneous architecture in the north of France.

The most remarkable of these churches are those at Issoire, which is the largest; Notre Dame du Port at Clermont; one at St. Nectaire, considerably smaller than the others, but with a beautiful grouping of the apsidal chapels; and one at Orcival, the latter standing in the midst of most lovely scenery, surrounded by a most quaint and primitive village, and celebrated in the surrounding country for the miraculous cures of Notre Dame D'Orcival.

This notice, as I stated at the commencement, is very slight: it is but an indication of churches which exist in a district, very near to one visited annually by the many English tourists who resort to the springs of Vichy. A district abounding with interest to the geologist, where the ancient lava streams still are as fresh as the lavas of Etna, although there has been no volcanic action in this district within historic times, and one which offers much of interest to the architectural student and archæologist,—a rich and comparatively unworked field to the architectural draughtsman, and to the photographer.

Although not in the Auvergne style, no architect would visit this district without seeing the remarkable church at Le Puy, whose great cavernous portico is unsurpassed in grandeur of effect by any building with which I am acquainted, and whose front bears a striking resemblance to many of the cathedrals of Italy. Near it is also the remarkable church of St. Michael, with a bell tower, which might pass for Italian. Mr. Street's paper contains the fullest account of these buildings.

The Rev. RICHARD BURGESS, B.D., Hon. Member, said he had listened with great attention and pleasure to all that had been said this evening. He confessed he never knew so much about Austin Friars Church as he had learnt this evening, and he rejoiced at having the opportunity to be present. The subject had been brought before them in a way that was most pleasing—with great simplicity and clearness, and no attempt beyond stating the real facts of the case, and that was the best way of conveying information. He heartily joined in the thanks given to Mr. I'Anson, and he thought that gentleman deserved their further thanks for the observations he had made upon the churches of a part of France, which he (Mr. Burgess) had visited once: perhaps he should go there again next summer, and he was sure he should derive benefit from what he had heard on that subject this evening. He felt he was a great loser by not being able to attend more frequently the meetings of this Institute, for which he entertained the highest respect and veneration. He concluded by proposing a further vote of thanks to Mr. I'Anson for his second communication.

Mr. WOODTHORPE seconded the vote of thanks, which was unanimously agreed to.

Mr. THOMAS MORRIS, Associate, remarked that the selected district seemed to be one of great historical importance. Like Mr. I'Anson, Mr. Street had brought before them (not very long ago) some admirable illustrations of the general character of those churches, as they appear to an observer passing through the country. But there was a higher interest in the churches of Auvergne, and that part of France, from the historical link which they seemed to afford in connexion with the Romanesque. In England we had a very clear account of our architecture from the Anglo-Norman period, but were accustomed to regard the Saxon as a mere sub-class of the Anglo-Norman mode. We had no complete specimens of it. Beyond that, we were lost in the void of the heptarchy; or if we went back to the Romans, we had no considerable remains of their edifices, but simply sufficient to shew that they adopted the same style in their colonies that was practised in the mother-country. But in this southern part of France, to which Mr. Street and Mr. I'Anson had devoted attention, stood the ancient city of Nismes, a city of great original grandeur, with temples, baths, city gates, amphitheatre and aqueduct. It still presented remains, in fact, which were not equalled, perhaps, in any other place out of Rome itself. They found, in some of the ancient remains (as the temple of Diana, more probably

Baths,) the *barrel or cylindrical vault*, which, with other forms and features of classic origin, was particularly noticeable in the churches of Auvergne and neighbouring districts; (at Valence it was employed lengthwise, and at Tournus in a series of transverse compartments): and generally, the details and forms of the Roman work, seemed to have been incorporated with more or less of transitional feature. He thought, indeed, that the whole history of Romanesque architecture, might be traced from those classic remains, down to the Norman. The link in the history of architecture, for which materials were so deficient in this country, could possibly thus be supplied; and great service would be rendered by any gentleman who, following such pioneers as Mr. Petit, Mr. Street and Mr. l'Anson, should record the historical bearings of Southern France, on the transition from the classic to the mediæval styles.

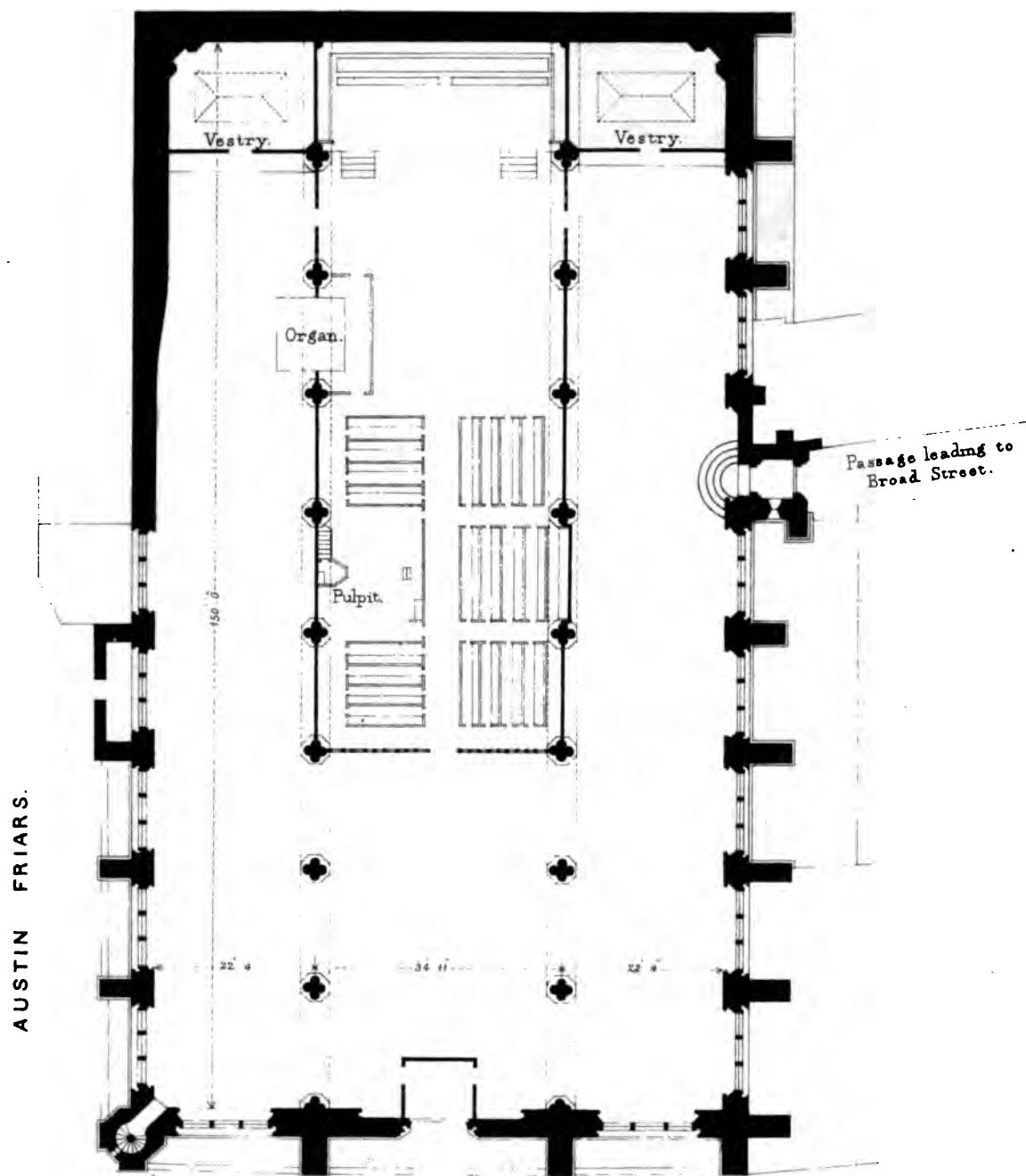
THE REV. R. BURGESS having promised a paper on a future occasion on the Aqueducts of Rome and the supply of water to that city,

THE PRESIDENT said he was sure such a paper would be welcomed with both hands. It was his pleasing duty again to thank Mr. l'Anson. He was quite sure that gentleman had as yet only gleaned a titling from the surface of the land, and he hoped that the writer, having once made himself acquainted with that most interesting district of Auvergne, would not make these notes the conclusion of the information with which he was prepared to favour the Institute.

The vote of thanks was then passed unanimously, and the meeting adjourned.

The Dutch Church, Austin Friars.

AS RESTORED BY EDWARD ANSON & WILLIAM LIGHTLY.



AUSTIN FRIARS.

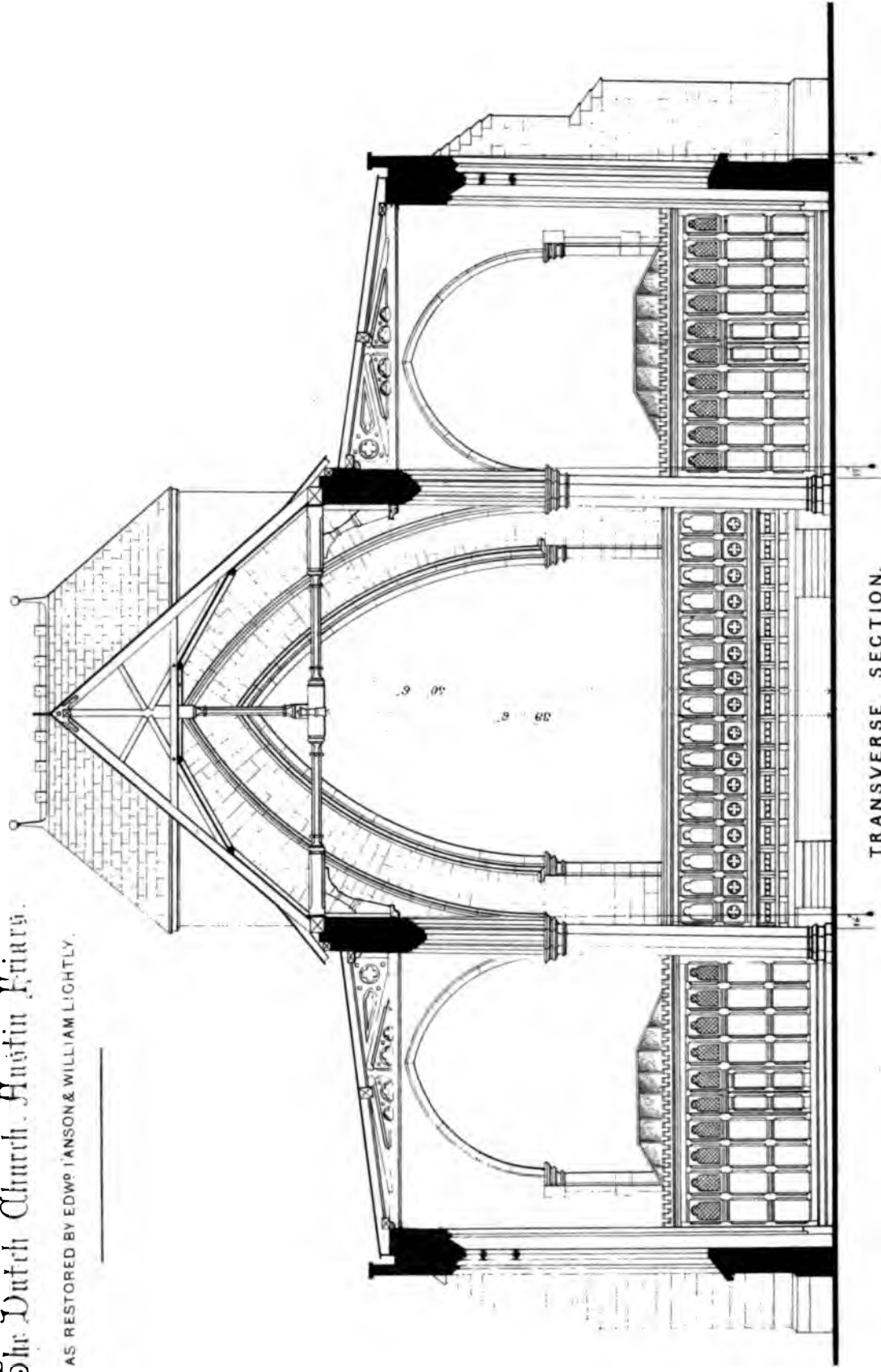
AUSTIN FRIARS.

Scale 24 Feet - 1 Inch.

10 5 0 10 20 30 40 50 Feet

The Dutch Church, Huelin Friars.

AS RESTORED BY EDWARD J. ANSON & WILLIAM LIGHTLY.



TRANSVERSE SECTION.
Scale. 12 Feet - 1 Inch.

10 5 0 20 30 40 50

Engraved for the R.I.B.A. by Geo. Brown & Co. Ltd.

ON THE CATHEDRAL OF ST. CANICE, AND OTHER ARCHITECTURAL ANTIQUITIES, KILKENNY, IRELAND.

By T. NEWENHAM DEANE, Fellow.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, February 12th, 1866.

THE Cathedral of Kilkenny being now in process of restoration, many things have been brought to light connected with its original design, which may make a short paper on the subject interesting to the Institute. In connexion with the description of the Cathedral, I purpose touching briefly on the other buildings of interest which still exist in Kilkenny—ecclesiastical, military and secular.

Under the first of these heads I would enumerate the Cathedral; the Augustinian Abbey of St. John the Evangelist, whose charter, in the "Monasticon," is dated 1220, founded by William Marshall, the elder, Earl of Pembroke; the Dominican Abbey, founded by William Marshall, the younger, 1225, dedicated to the blessed Trinity, commonly called the Black Abbey; the Franciscan Abbey, founded 1230; St. Mary's Church, probably finished 1328; the Vicar's Hall, near the Cathedral, and other buildings forming part of the Cathedral establishment. Under the second head, the Castle forms the most interesting object of attention. Under the third head, I would mention the Hospital founded by Sir Richard Shee, 1581, and several houses dating from the Sixteenth Century and onwards.

THE CATHEDRAL.—A full description of this beautiful and interesting structure has been given by the Rev. James Graves, in his book on the "History and Antiquities of Kilkenny," from which, and other authorities, I have made a few notes. St. Canice, to whom this church was dedicated, was a man of distinguished piety, the intimate friend of St. Columbkille, on the model of whose foundation at Iona he founded a monastery at Aghaboe, in Upper Ossory, which existed in 577. The earliest allusion to Kilkenny, in "The Four Masters," A.D. 1085, mentions that Cael Cainnagh, or the Church of Canice, was partly burnt—probably a wooden structure, which was shortly after rebuilt, and destroyed by fire 1114. After this second destruction, it appears to have been raised again, of more costly materials. Numerous carved stones, of twelfth-century work, have been found built into the walls, and under the paving of the present church; and extensive foundations at the eastern end of the Cathedral indicate that a church of that period existed. In 1189, William, Earl Marshall, the elder, through a marriage with Isabella, only child of Richard FitzGilbert, Lord of Ossory, became Earl of Pembroke and Lord of Leinster. With this nobleman commences the authentic history of Kilkenny. He was appointed Governor of the Kingdom of Ossory, by Prince John, 1191—Richard I. being then in exile. He erected the Castle 1192, returned to England 1194, came back to Ireland 1207, *rebuilt* the Castle of Kilkenny, and gave a charter to the town, under which it still enjoys certain privileges. In 1202, we find the see of Ossory at Aghaboe, St. Canice's original foundation, under the prelacy of Felix O. Dullany, who was succeeded by Hugh Rufus, or De Rous, an English Augustinian canon, and the first English Bishop of Ossory. This prelate exchanged the see lands of Aghaboe for others at Kilkenny, belonging to the Lord of Leinster, and probably used the church which he found on the site of the present cathedral, as it is stated "he did nothing *further* for his episcopal see." From manuscripts in the Ormonde Collection, we find that a cathedral existed in 1229. This may have been the ancient church of Dullany's time, or the choir of the present church, used as a cathedral prior to the completion of the structure. Bishop Hugh, de Mapleton carried on the work with great vigour from 1251 to 1256, and nearly brought it to a finish. Geoffrey St. Leger, 1260, completed the Cathedral, at great

cost. From the foregoing remarks, it will be seen that the present structure, in its main features, was built between the years 1251 and 1260, and possibly may have been commenced before 1229. In 1332, we find that the belfry fell, breaking the side chapels. For twenty years the cathedral remained in a ruinous condition, when, in 1354, the tower was restored, the vaulting of which was put in by Bishop Hackett, 1460 (this prelate was architect of the Convent of Bathalla in Portugal). In 1338, Bishop Ledred filled the windows with beautiful stained glass, particularly the eastern ones, which represented the whole life of Our Lord. So beautiful were they that Rennuccini, the Pope's Nuncio, who saw them in 1645, offered £700. for the stained glass, which was declined by the then prelate, David Roth. In 1650, those windows were demolished by Cromwell, who broke the monuments and "took away the great and goodly bells, and threw down the roof thereof." On the 12th of August, 1658, the Commonwealth passed "An Act for the Reparation of Churches," which does not appear to have taken effect on the Cathedral. In 1660, Bishop Williams, finding the church in this ruinous condition, commenced to repair it, expending on the choir alone £400. From this date until 1675, the Cathedral underwent sundry repairs, and was supplied with a ring of four bells at a cost of £246. 18s. 10d. In 1677, Bishop Parry supplied plate, value £100.; and, 1756, Bishop Pocock, finding his cathedral almost totally neglected, its roof tumbling down, and its monuments broken, commenced the work of renovation, and with the assistance of his chapter placed the Cathedral in the condition in which it has been handed down to us when the present restoration was commenced. The fittings of the choir put up Bishop Pocock, being of a Grecian character, were quite at variance with the architecture of the cathedral, as were also the stucco ornaments which covered the ceiling. In 1863, the roofs were found to be much decayed, and it was then determined to restore the church, as far as possible, to its original condition.

The accompanying plan gives the general arrangement and principal dimensions of the Cathedral, which is the second in point of magnitude in Ireland. The total length is 226 feet, breadth at transept 128 feet. The chapels on either side of the choir, marked upon the plan H and K, have given rise to various discussions as to their use; until the present alterations were commenced, the only access to these was through small doors, one opening from the north transept, the other from the Lady chapel. The removal of the old plaster on walls, disclosed the fact that these chapels were divided from the choir by large arches, with beautiful mouldings and corbels. Similar arches opened into the transepts. The fall of the tower, in 1360, carried in its ruin part of the adjoining arches and walls of choir and transepts: when the tower was rebuilt, the injured walls were carried up in solid masonry, and thus the arches alluded to were blocked up. One of the principal features in the present restoration is the rebuilding of these arches, completing their mouldings and corbels. The clerestory windows of choir, five at either side, which were also built up, are likewise being restored.

The church appears to have undergone several changes, shortly after its erection in the thirteenth century: for instance, the Lady chapel, marked L on plan, although a beautiful specimen of early English work, has clearly been an addition, as the wall of side chapel, at K, shows indications of a continuous arcade of arches, proving it to have been an outer wall. Almost all the windows in the Cathedral have detached and filleted shafts. The east end of choir is very beautiful, having nine lights, with detached and filleted shafts, heads cusped on interior, and semicircular on exterior. The windows were originally filled with the stained glass, so much admired by the Papal Nuncio, and for which he offered so large a sum in 1660. Funds for the restoration are too limited to allow of those large windows being restored. It is, however, hoped that persons interested in the work may be induced to lend their aid to the accomplishment of this part of the restoration.

The Lady chapel, E on plan, owing to defective foundations, has had to be rebuilt, the stones being

numbered and used in the work. A complete arcade of arches runs round the two external walls, south and east. On the former there are nine lights, in groups of three, with three drop arches to the interior, with marble filleted pillars and carved capitals. To the east, six lights, grouped in pairs, with drop arches and pillars. This portion of the building will be used as chapter-house.

The small chapel, marked G on plan, is the parish church. This and the two side chapels have each their aumbry and piscina. On the south side of choir has been discovered the site of the sedilia: sufficient indications of the designs remain to enable it to be correctly restored. Higher up, beneath the side windows, are two recesses—the one an aumbry, the other a piscina.

The carved capitals to windows of the side chapels are interesting, as giving a certain weight to the theory put forward by Mr. Skidmore, that early English foliage takes its type from metal work. (See Fig. 3.) Each capital has its foliage bound round, as it were, with a hoop. These windows are being carefully restored, no stone being cast aside which can possibly be re-used in the work. On the walls of side chapels the original decoration has been discovered—scrollwork of excellent design in black, orange, and green, running under the wall-plate, the walls covered with what may be called an ashlar pattern. It is proposed to carry out the same mode of decoration in the new work. The roofs of the side chapels owe their design to the only remains of an early English roof I have seen in Ireland, that of Callan Church, removed some years since.

The roofs of the whole church are new, stone gutters having been used throughout, behind the parapets, which are embattled—the most usual finish for ecclesiastical buildings in Ireland; still, I am of opinion that such was not the original design, but probably dates from the fourteenth or fifteenth century, portions of tombstones of an early date forming part of their structure. Still, they are of sufficient antiquity, and nationality in their character, to make it desirable to maintain them. (See Fig. 2.)

The porch is interesting as having been, in 1478, the scene of the murder of Richard, the son of Edmond Mac Richard Butler, in revenge for a similar outrage enacted thirty-five years before under his direction. The mouldings of the entrance archway are very beautiful, and busts, which are introduced in the carving, exhibit as a fastening to the cloak what is now known in Ireland as the Tara Brooch. (See Fig. 7.)

On removing the pavement, several patterns of ancient tiles have been discovered, some of which have been forwarded to Messrs. Minton, with a view to their reproduction. The device is generally incised, four tiles forming the complete pattern, two glazed with a black glaze and two with a red. A scale pattern has also been discovered, all red. Several stone coffins have been brought to light; and an effigy, face downwards, forming part of the modern paving, has been revealed. On opening an ancient vault, which is supposed to have belonged to the Ormonde family, a leaden coffin was discovered. The profile of the body, having been copied in lead, formed the upper portion of the coffin; the under portion is shaped in such a manner as would have fitted into the hollow of one of the stone coffins which have been dug up. In this same vault a leaden urn, supposed to contain the heart of Viscount Mountgarret, was discovered.

In examining the ruins of Ireland, it is interesting to trace the influence of a particular architect, or band of workmen, in various districts. In Kilkenny I trace the workmen who were employed at Christ Church, Dublin, and probably at Boyle Abbey—the filleted shaft and writhed angle shaft, as in north transept doorway, are to be found in all three. (See Fig. 4.) In Co. Galway, the tracery of altar tombs and windows evinces that the same mind was there at work, if it was not executed by the same workmen. In Waterford, again, I see the handiwork of the Kilkenny craftsmen. In mentioning this, I do not wish to infer that one thing is a servile copy of another, but that there is

sufficient to lead the enquirer to the conclusion that certain men carried their art from place to place, and were esteemed for their talent in architectural construction.

The general details of Kilkenny Cathedral are much simpler than is usual in English churches, owing to the hardness of the materials employed, and limited means; but the proportions, as in most Irish churches, are very good, and the simplicity and massiveness of the work give an idea of size which elaborate tracery, and multiplicity of mouldings, would not have produced. It would prolong this paper to unreasonable limits to enter into a description of the monuments and effigies of many noble families contained in this interesting building. One curious tradition I would mention connected with the device often used on tombs in Ireland, such as the implements of Our Lord's passion, representing the cross, pincers, crown of thorns, &c., in addition to which a cock is represented flying out of a pot—the tradition being that, when Peter denied Our Lord, the cock was supposed to have been boiling in a pot, and to have got out and crowed on hearing Peter deny Our Lord. (See Fig. 6.)

The work of restoration has been pressed on with vigour, and it is hoped that the Cathedral will be ready for service in about six months. The roofs are finished, the arches between the choir and side chapels opened, the prebend's stalls in hand; still, much remains to be done. The tower must rest in its present unfinished state until funds are collected for its completion. No pains or trouble will be spared by the dean and chapter to bring the work to a satisfactory conclusion. The chapter of St. Canice consisted of twelve members, of whom the dean, archdeacon, chantor, chancellor, treasurer, and two prebends *had* manse houses surrounding the Cathedral, the dean for the time being lord of the manor of the glebe. The vicars choral were a very ancient corporation, liberally endowed by Bishop St. Ledger, 1260, who gave them his manse and lodging. The vicars had a common hall and separate cells, read at meals, but were silent at other times, which shows the monastic character of the institution. The community consisted of four vicars (who were obliged to be priests), four stipendiaries, and four choristers. When a vacancy in the vicars occurred by the death of a vicar, the senior chorister, on being made a priest, filled his place. Considerable portions of the common hall still exist, particularly the gable end, which has a very interesting window.

At the north-west angle of the Cathedral Close is the library, founded by Bishop Otway, 1676. In mentioning the mode in which his bequest was to be expended, he enumerates "claims for every particular book." At the eastern corner of the south transept stands one of the round towers almost peculiar to Ireland, and so ably written on by the celebrated antiquarian, Dr. Petrie, whose theory that they are of Christian origin is, in my opinion, thoroughly borne out by the following facts. The tower, which is one hundred feet in height, was filled to a considerable depth with accumulated rubbish, principally the deposit of birds. This was removed, and on digging two feet below the outside level, human remains were discovered, contained in wooden coffins, placed partly under the foundations. The tower must have been erected on, or nearly on, the surface of the ground, which ground must have been a place of burial previous to its erection; and the position of the remains, with reference to the points of the compass, indicates that they were those of Christians. (See Fig. 5.) It is curious that a structure of such height, and small base, should have stood so well, resting on such a foundation.

PRIORY OF ST. JOHN.—The oldest monastic foundation in Kilkenny is the Priory of St. John, founded by William Marshall, the elder, Earl of Pembroke. In 1645, when the abbey of Ireland were everywhere being restored, the Augustinians claimed their abbey; but the Jesuits, being the more powerful body, opposed the claim, and were confirmed in their occupation by Rinnuccini, the Pope's Nuncio. Dr. Ledwick states that a portion of the abbey was pulled down to make room for an infantry barrack. Sufficient, however, remains to show much of its original extent and beauty. Fifty-four feet

of south side of choir is a continuous arcade of lancet windows, the largest pier being only nine inches wide. It is to be regretted that, in converting this ruin into a modern church, the windows have been cut down, especially the eastern one, and every second light stopped up. These ruins contain several monuments and effigies of great interest. The design of the chapter-house at the Cathedral was taken, evidently, from the choir of St. John's.

THE FRANCISCAN ABBEY, situated among orchards near the river, exhibits some interesting details. The east end is lighted by five lancets. The choir and tower of this abbey alone remain.

THE DOMINICAN ABBEY (for plan, see Fig. 8).—The Dominican or Black Abbey, founded by William Marshall, the younger, 1225, has lately been restored by J. J. MacCarthy, Esq., Architect, to whom I am indebted for the plan which accompanies this paper. It is interesting as showing how the simple form of the Dominican or Franciscan churches were added to, the most usual shape being two parallelograms, nave, and choir, sometimes with a narrow tower between. Frequently this tower is an addition. In the present instance, the usual addition of the two chantries has been extended to aisled transept and nave. The top of the tower is a particularly good specimen of crenellated battlement and truncated roof. (See Fig. 1.)

ST. MARY'S has little of its original architecture worth describing; the church has been completely modernized. Surrounding the church are several tombs of great interest, principally of the fifteenth and sixteenth century, belonging to the families of Archer and Shee.

THE CASTLE, the seat of the noble family of Ormonde, is beautifully situated overhanging the river. The plan originally consisted of four towers, with curtain walls between them, the entrance in the centre of eastern side, where lately the foundations of two minor towers were discovered. The walls are, in some parts, eleven feet thick. The vaulting on lower story has been turned on wattle centres, which never were removed; in some parts the basket work still adheres to the mortar above it. The several alterations which the Castle has undergone, to adapt it to modern use, have, as usual, obliterated much of the ancient character. Within the last few years considerable changes have been carried out, under my advice. The picture gallery (see photograph) is a fine apartment, 146 feet long by 28 feet wide, which, together with the rest of the castle, has had to be re-roofed. The painting of the gallery was entrusted to J. H. Pollen, Esq., who has been most successful in producing a beautiful work. The muniment room contains documents of the most valuable nature, which it is hoped may yet come before the public in some form of publication. It has taken many years to arrange these papers. The task was committed to the Rev. J. Graves, who has entered into the matter with all his heart.

THE HOSPITAL OF SIR RICHARD SHEE was founded in 1581 for the maintenance of thirteen poor people. The lands connected with this endowment have passed to others. The building, although in a very dilapidated condition, gives accommodation to several old women (who are fast dying away). It is not the intention of the present proprietor, N. P. O. Shee, Esq., to fill the vacancies until steps have been taken to repair the hospital, and place it on a better footing.

Throughout the town are many old houses of a domestic character which will interest the architect; and the surrounding country is full of buildings which will amply repay for the trouble of a visit—of which I may mention Kells, Jerpoint, Freshford, Thomastown, Gowran, Dunbrody, and, by extending a tour a little, Cashel and Holy Cross, &c., &c.

Professor DONALDSON, Past President, said it was usual, he knew, for the President or Chairman of the evening to invite members to offer such remarks as occurred to them on the subject of the paper read before them; but, as he was aware that their worthy Chairman had very considerable knowledge of this cathedral, he was sure the meeting would concur with him in requesting that he would be good enough

to give them the information which his attention to this subject had put him in possession of. No one more appreciated the beauties of ancient architecture, and no one could better discriminate the different epochs at which the works were carried out. He therefore hoped he would favour the meeting with his observations on this interesting monument of ancient architecture.

The Chairman, Mr. G. E. STREET, Vice-President, expressed his regret at the absence of Mr. Deane, because he, for one, would have been glad to have asked a few questions of the author of the paper. It was some years since he had himself seen this cathedral, and his stay in Kilkenny was not a long one. He had not been aware of the subject of the paper until late that afternoon; but, as he felt extremely interested in Kilkenny Cathedral, he made a point of attending to hear Mr. Deane's paper upon it. It was interesting, in the first place, as being a charming example of a cathedral on a small scale—very small indeed if compared with most of those in England. At the same time, it had a cathedral air, and was just such a structure as one might suppose would be adapted to our colonies in the present day. It was not on a scale that would be satisfactory in this country; for in size it was not larger than many of our large parish churches, though possessing considerable dignity and effect. Perhaps the most interesting point in connection with this cathedral was its thoroughly English style of architecture throughout, with the single exception of the parapets, which are all of the peculiar design which was so universal a characteristic of later Irish architecture; and he agreed with Mr. Deane, in the present instance, that they must have been an addition to the original structure. He had no doubt it was designed originally without a parapet, the roofs being of a very lofty pitch. The roof shown in the photograph was not of the original pitch, which resembled much more that which was shown on the aisles; and he imagined it must be intended to raise the new roofs to the old pitch. The same character of work would be found in other churches and buildings in the same district, particularly at Cashel and Ferns Castle (excluding, of course, from the former the most interesting, but thoroughly Irish, Cormack's Chapel); and, from his examination of the work, he had come to the conclusion that the architect who built Kilkenny Cathedral came either from South Wales or Somersetshire, for he had traced the works of the same architect on both sides of the Bristol Channel. The western part of the church was extremely simple in design, the arches being of the plainest kind, well proportioned, but simple almost to severity. The western window was a lofty triplet; and at the bottom, over the western door, there was a curious sort of two-light window inserted, which it was difficult to account for, except as a freak of the architect. He noticed in all the work of this part of Ireland a great love of the trefoil and quatrefoil, the inside arches, even of many of the windows, being trefoiled. The clerestory was remarkable: the windows were quatrefoil openings, and, if he remembered aright, over the columns, and not over the arches. The same arrangement is to be seen at Jerpoint Abbey, at a slightly earlier date, and it was not uncommon in English works. There was, also, another curious feature in this cathedral—that was, the mixture of two-coloured stones. He believed Caen stone was used when white stone was required, and the native dark limestone elsewhere. In the west door arch, there were alternate voussoirs of Caen stone and limestone, and the filling-in of the top of the doorway was a delicate carving enclosed in a quatrefoil. The shafts in the eastern part of the church were of Kilkenny grey marble, and generally very delicate in their proportions. He was very glad to find that one of the most unsightly things he ever saw—viz., a great wall which divided the tower from the chancel—was already destroyed. It was, when he last saw it, the most doleful church conceivable; and, to make it more doleful, there was a churchyard wall from ten to fifteen feet high, over which he supposed the poor Irish were expected to climb, in order to get even a sight of the Cathedral! As to the steeple, that was said to have fallen in 1332; but it was only as far as the belfry, he believed, that it fell. There was no drawing which showed the present character of it; but his impression was that only the upper part of the steeple fell, and then the

steeple was finished with the Irish battlement and groined. Reference had been made to the church at Batalha, said to have been built by the same architect in 1360. The groining here, like all the other Irish work of the same date, had a great deal of foreign character about it; but he had not seen Batalha, and could not say how far there was any evidence of similarity of character. Perhaps the most striking part of the church was the transept, which was very long, with lofty lancet windows on the side and end walls, and a very picturesque staircase turret on the west of the south transept. Altogether, he knew but few churches which, though so small and so simple in style, had struck him as being so valuable. From some of the dimensions he had in his possession, he had made one or two notes, which would be interesting to those who were curious in the proportions of these old structures. The columns in the nave were 21 ft. from centre to centre east and west, and 31 ft. 4 in. from north and south, and 10 ft. 4 in. high, so that the height was about half of the dimensions from centre to centre east and west, and one-third that north and south; and triangles inscribed on their bases seemed to give the height. He noticed that there was a great deal of dog-tooth throughout the eastern part of the church, and where there was any moulding it was extremely good of its kind. It was evidently done by workmen who were imported for the purpose. His own impression was that the battlemented work was done at the time of the repairs by Bishop Williams in 1660; but those more conversant with the earlier work might be able to say more about it. At Waterford he did not remember seeing marks of the same workmen, referred to by Mr. Deane, but his own evidence in that respect was of a negative character. There were two or three other churches mentioned in Mr. Deane's paper, on which he would just touch. The Dominican abbey, commonly called the Black Abbey, which had a tower placed on the south of the altar, in a most singular way: it had a rather fine fourteenth-century window at the west end. The plan of that church was extremely odd, and had evidently been obtained by adding to from time to time. It contained several very fine gravestones. Another church which interested him much was the Franciscan church, where the tower was placed at the east end of the nave, with a chancel at the end. The tower was much narrower than the nave, but exactly the width of the lofty arch which supports it, so that, now that the roof was gone, the construction looked extremely bold and hazardous. The windows in this church were extremely good. In conclusion, he remarked that the town of Kilkenny was one of the most interesting in Ireland, and would amply repay the visit of any architect in quest of good work. He believed, as he had said, that most of it was done by Englishmen, and it was therefore the more reasonable that English architects should go to look at it; whilst, in addition to it, many works of great interest were to be met with, at Jerpoint, Cashel, and elsewhere, in the same district. In fact, there was such a store of works that the only wonder was they had not been more studied by English architects than they had apparently been hitherto.

Mr. GORDON M. HILLS, Associate, remarked that the Chairman had filled up all that could well be said upon this church, and he had touched on most of its peculiarities. Kilkenny Cathedral might be taken as about the third in rank of the Irish cathedrals. Limerick Cathedral was one which he considered remarkably grand in effect, notwithstanding the extreme simplicity of its architecture. In plan it is a cross church, enlarged into almost a square form by additions outside of the aisles, and which, moreover, are raised so high as to cover the original clerestory. As to the observation of the author of the paper with respect to the band of workmen whom he supposed to have travelled in the execution of these works, he did not think there was any good foundation for that supposition. His own belief was that Cormac's Church, at Cashel, consecrated in 1135, was the last important work of fixed date of the Irish before the English invasion. After that, there were two influences which produced another style. The first was the introduction, in 1148, of the Cistercian order of monks, and the first building erected by them was that of Mellifont Abbey, which, it is authentically known,

astonished the people by its superior pretensions over what they had been accustomed to see. At Mellifont there are not now any remains of that work, though there is much that is curious of later date. The next work of the Cistercians of which they had an account was Boyle Abbey, much of which still remains in good order: and Cistercian work of about the same era is still to be seen at Jerpoint Abbey, Baltinglas, Manistex, near Croome, and other places. Boyle was referred to by Mr. Deane, and was executed by the Cistercians, and not, he (Mr. Hills) would conceive, by those who erected Kilkenny Cathedral, the latter structure having been built under the influence of the English invaders; and, as the invaders came from South Wales, it was not to be wondered that there was a resemblance between their works in Ireland and those found in South Wales. The banded shafts were remarkable, and they were found in many parts both of Ireland and England. Perhaps the most remarkable example in England was that at Walsoken, near Wisbeach, where the chancel arch has four small shafts in each pier, all banded five or six times in this manner. There were other instances of the kind in England, but that at Walsoken was additionally striking from its greater antiquity than any of the Irish examples. [THE CHAIRMAN: Romanesque, like St. Alban's.] The Franciscan Friary was one of a numerous class. He could mention, probably with ease, fifty towers which were erected in the way the chairman had described. The fact was, except the round towers—which ceased to be built when the English went to Ireland—and the low Cistercian towers, the Irish churches up to that period were almost towerless. In a few instances other towers could be named, as the fine massive one of the Trinitarian Friary at Adare; but suddenly, in the fifteenth century, it became the practice to build to the Franciscan and Dominican structures these lofty, slender structures. The nave was shut out from the choir by two transverse walls, placed close together, and pierced each with a narrow arch. Above the arches rose the slender tower, standing, as it were, on the apex of the gables, instead of spreading over the width of the nave. He remembered Professor Donaldson drawing attention to one of those towers at the Magdalen Tower at Drogheda, the remnant of a Franciscan or Dominican church: there were also two at Adare, one at Kilmallock, and at Rosserick, Moyne, Clonmines, Quin, and many other examples might be adduced. He thought, with respect to these peculiar Irish battlemented parapets, there was no doubt that at Kilkenny was of late date. And undoubtedly many other instances were equally late. The earlier method at Kilkenny it was not easy to determine, for, if a different method had existed, it had, so far as he knew, all been superseded elsewhere by this of late date. The people lived in the midst of war to a comparatively modern period, and it was always necessary to have and to renew means of protection round the building, which these parapets afforded, and which were not necessary for the same objects in this country.

Mr. J. P. SEDDON, Hon. Sec., said that the plan of Kilkenny Cathedral was almost identical with that of the Priory Church at Brecon, and that there were many other buildings in Wales very similar in character to those that had been described, possessing the same simplicity of detail and general proportions; and the banded columns and roll mouldings to which Mr. Deane had called attention as a feature in these Irish churches, found their counterpart at Margam Abbey in Glamorganshire, the west front of which, though sadly modernized, still possessed a fine triplet of windows, and doorway below banded in this peculiar manner. Another most interesting example of the kind existed at Strata Florida Abbey, in Mid-Wales: this was so very beautiful that it was worth making a pilgrimage to. It was called the Crozier Arch, from the fact that the several zones or bands of the arch were continued on the face of the wall in the semblance of croziers exquisitely carved, in the character of the Transitional style, between the Norman and Early English, so highly characteristic of the western counties. In reply to a remark by Professor Donaldson, as to the entire absence of figure sculpture in these early works, the decorations being entirely confined to architectural sculpture only, Mr. Seddon mentioned that at

Kidwelly Church, in South Wales, between Carnarvon and Llanelly—which was a very fine structure, with a noble spire—over the archway in the porch to the nave he had lately seen a beautiful and most interesting statue of the Virgin and Child, sadly broken and dilapidated, and resembling the well-known Early French type; yet, nevertheless, it was doubtless true that figure sculpture was rare.

Mr. WILLIAM WHITE, Fellow, had seen many of these works which had been referred to, and it was to be regretted that they were not more visited than they appeared to be. He would add one word to what the Chairman had said as to the beauty of these Irish memorials. It was to be remarked that, with all their simplicity, most of the Irish structures of that date exhibited a wonderful grace of proportion, more so than many of our own works, and they were equally remarkable for that exceeding simplicity. He apprehended, however, that the Chairman more especially referred to the geometrical proportions of the buildings. Several of the earlier buildings in Ireland, which exhibited the greatest beauty of proportion, appeared to have followed accurately several of the proportions used in their earlier and ruder works. And these proportions were of a somewhat remarkable character, produced in a way that could not possibly have been accidental, and could have come only from their following a definite system. He had, from the study of these remains, arrived at certainties on several points which had been of interest and value to himself. But he wished to say one word with reference to the parapets. It appeared to him that this building was originally designed to have a parapet. The character of the whole work appeared to him very much as if this was intended, although, from a slight difference perceptible in the work, it was probable they had been rebuilt. But he did not think they were wholly additions. What these had been there was nothing to show; but he had seen a number of instances of the Irish form of parapet which seemed to him as early, and in some cases almost earlier than the date of the building on which this particular parapet was found.

The CHAIRMAN remarked that there was the old corbel table at the bottom of the parapet.

Mr. HILLS repeated his impression that it was a modern parapet.

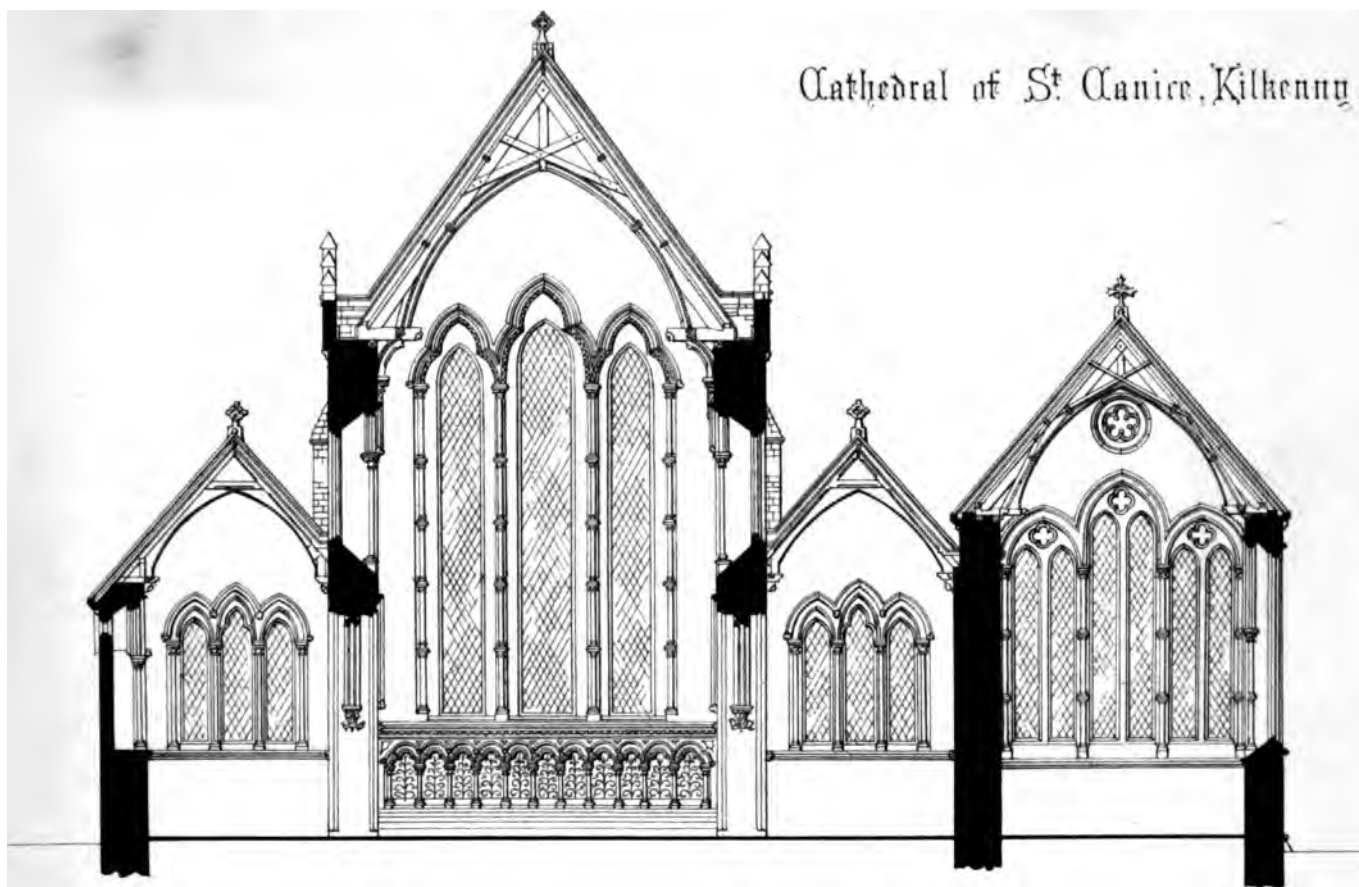
The CHAIRMAN added that there was not a bit of old stone in it; it was made up of plaster.

Professor DONALDSON then proposed a vote of thanks to Mr. Deane for his paper.

Mr. THOMAS MORRIS, Associate, said he had listened with great pleasure to the reading and discussion of this paper. It afforded, he thought, an allowable opportunity of remarking that the recent publication of the new catalogue revealed many deficiencies in their library. Amongst them might be mentioned, as particularly relevant to this subject, the late Dr. Petrie's work on the "Ecclesiastical Antiquities of Ireland." It was a work of great learning and value; and, although the "Round Towers" formed the staple subject, it went largely into general questions of ecclesiastical architecture. They had lost Dr. Petrie himself, but it was not perhaps too late to obtain a copy of his very serviceable and finely-illustrated book. He hoped, at some time or other, his theory of the round towers would be overturned; but he thought, nevertheless, the work was one of great value, and would be very useful in the library of the Institute.

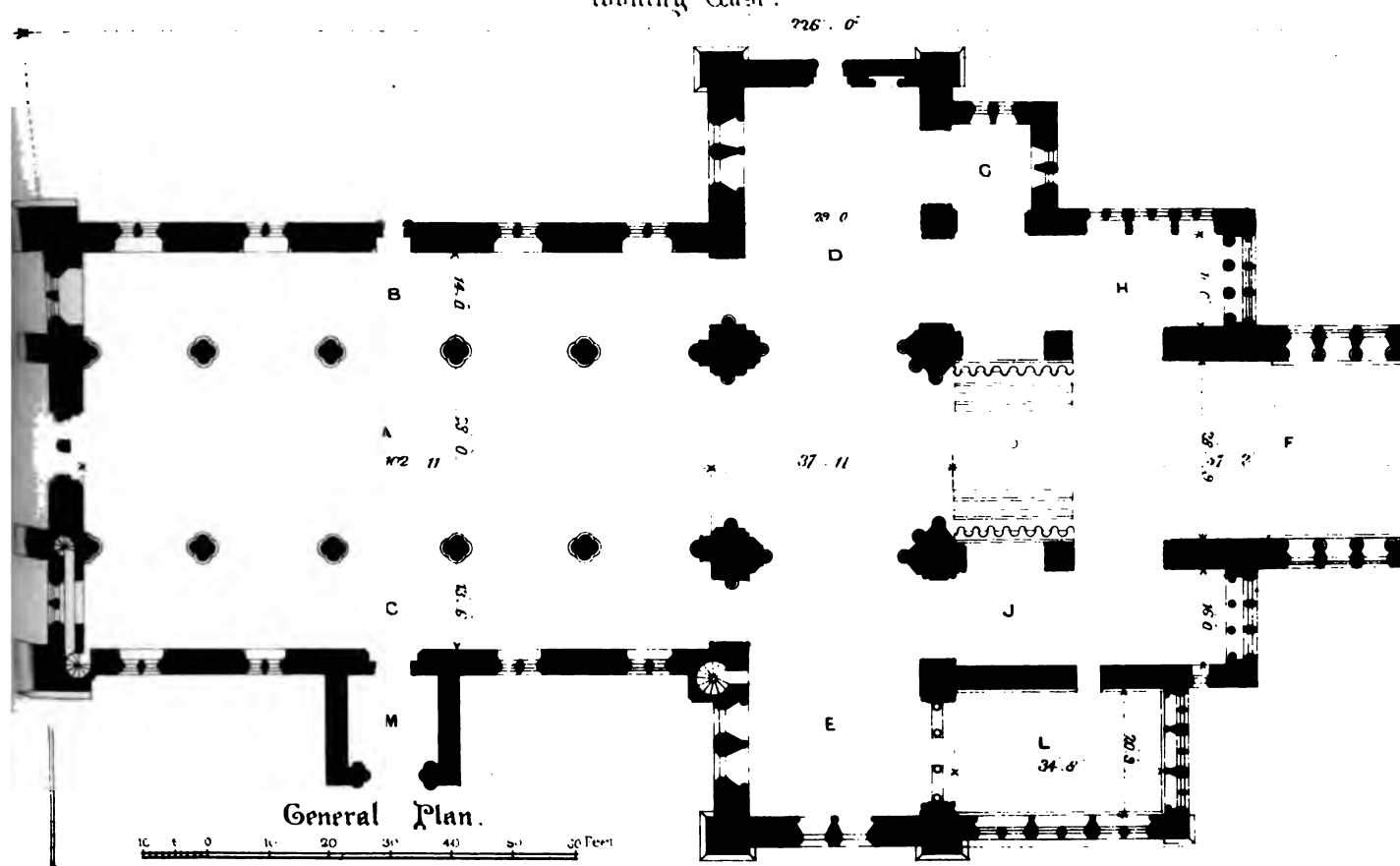
The vote of thanks having been unanimously accorded to Mr. Deane, the meeting adjourned.





Cathedral of St. Canice, Kilkenny.

Choir, Chapels and Chapter Rooms.
looking East.



Designed for the R.I.B.A. by R.E. Bro. Land in R.C.

from the same point, the Roman, and each continued to imitate the Roman buildings,* without much essential variation, though not without very marked provincial characteristics down to about the year 1180, or at least until the middle of the twelfth century. Whether the change of style began at an earlier period in one country than another is a much disputed point, but it is clear that these three buildings are so much on a par, and so nearly of the same date, that one may safely say that from this point the three nations started fair in the same race. In England, the progress during the last twenty years of the twelfth century was wonderfully rapid, from the corona and the transepts of Canterbury in 1184 to the choir of Lincoln, the presbytery of Rochester, and the galilee of Ely, all before 1200; the progress, although not unnatural nor improbable, was such as to show the wonderful energy and activity of the English people at that period. It is very questionable whether the progress was equally rapid either in France or in Normandy, when the facts are closely investigated, although it has long been usual to consider that England was always behind the continent, and borrowed all its ideas from thence. My present object is to explain and illustrate the Gothic portion of St. Stephen's, at Caen; but this can hardly be made intelligible without examining the early Gothic of Caen and its neighbourhood, which may fairly be called the early Gothic of Normandy, for this is the district in which it is found most pure, and less mixed with that of other countries. On the banks of the Seine, as at Rouen, it is mixed with the Parisian style, or more correctly the style of the *Isle de France*, of which Paris was the capital. In the southern parts of Normandy it is mixed with the styles of Anjou and Maine, and and in the sea ports with the English, as at Eux, but in Calvados we have the early Gothic of Normandy in all its purity, and a very beautiful style it is, equally distinct from the English and the French; and I do not think that an examination of the dates, as far as they can be ascertained, or the progress of the styles, will bear out the assumption that the early English Gothic was borrowed from Normandy. The style of the choir and apse of St. Stephen's at Caen, evidently comes between the nave and the apse of Lisieux, the latter being pure Norman Gothic, and in the opinion of the best Norman antiquaries the date cannot be put before 1200, and between that and 1220 is the probable date. The only vestige of the Romanesque style is the use of the zigzag ornament in the mouldings of the arches of the choir, and perhaps the very singular use of plain segmented arches to carry the vault of the triforium gallery, partly enriched by the ornamental heads of the arches of the arcade in front of them. This is a clumsy piece of construction, which would hardly have been used after the Gothic style was established.

It is time to enter more into detail in the description of this interesting edifice. Of the original choir of the eleventh century nothing remains visible, but by a very careful examination in the roofs of the aisles above the vaults of the triforium gallery, in which I was accompanied by M. Bouet and M. Cordier, we found just sufficient vestiges remaining against the wall of the central tower and transept to show that the plan of the original choir was the same as that of the nave, having a vaulted triforium gallery of the same style as the present one, for a small portion of the early vault still remains. This choir was no doubt short, with an apse according to the custom of that period, and it was entirely removed to make room for the present choir. Along with the choir, the apse with the apsidal chapels, and the aisles, the chapels on the eastern side of the transepts were also rebuilt, and the one belonging to the south transept, now used as the sacristy, remains in good preservation, and in a more genuine state than the rest of the church, having escaped the present mis-called restoration, which here means

* Probably that variety of the Roman style which is called Byzantine, and especially that branch of it which had been worked out in Syria, and drawings of which were brought home by the Crusaders, had considerable influence on the ornamentation of the Romanesque styles of France, Normandy, and England. The recent valuable work of the Count de Vogüé throws much new light on this subject.

scraping, to which all the rest has been subjected. While we cannot help lamenting this vile practice of scraping the surface of the old masonry, which entirely destroys its original character and the tool-marks of the early masons, which are often very important for tracing the history of the buildings, we must at the same time give the Normans full credit for the great care and skill with which all the necessary repairs have been effected. It is difficult to believe at first sight that a large part of this church, and especially of the choir, is really the work of the seventeenth century, and yet it is perfectly certain that such is the case. The church narrowly escaped being entirely destroyed by the Protestants under Coligny, and a considerable part of it was actually pulled down by them, and restored at the expense of the abbey about sixty years afterwards. The best proof of this is that the builders' accounts are preserved among the archives of the town, and the orders given by the monks that the original work should be copied as faithfully as possible. These orders were obeyed very conscientiously to the best of the ability of the workmen, but a careful examination, with the assistance of the keen eyes of my friend M. Bouet, has enabled me to detect all these real restorations, and the changes that have subsequently been made in some parts.

The engravings published by Pugin and Cotman, and others, and the excellent drawings of M. Bouet, several of which have been engraved as illustrations to this paper, will give you a better idea of the plan and arrangement, and the details of this beautiful choir than any verbal description can give. But the manner of working the surface of the stone, and the width of the joints between the stones are seldom attended to in any drawing or engraving; and as it was shown in describing the nave of this church, that these minute points are sometimes very important in tracing out the history of the fabric, they must not be overlooked in the choir, where they are of nearly equal importance in distinguishing the work of the thirteenth century from that of the seventeenth. On the surface of the stones of the twelfth century the marks of the hatchet are in diagonal lines: in those of the thirteenth the lines are nearly horizontal, and worked with much care: in those of the seventeenth the surface has been smoothed with the scraper, which has been mercilessly applied in modern times on all the parts that are exposed to view. The joints of mortar in the thirteenth century are of about the same width as those of the twelfth, but the edges have been grooved with an iron tool, so that they are slightly hollow instead of projecting. In the modern work no care is bestowed on this matter, so that the manner in which the joints are finished is a safe guide to the dates of the different parts of the work, which are sometimes mixed up together in a very intricate manner. The vaults of the choir and of the triforium gallery were almost entirely rebuilt, and the bosses at the junction of the ribs of the apses bear the arms of Charles D'O., who was abbot from 1582 to 1620, and of other dignitaries of the abbey at the same period. A careful examination shows that the mouldings of the ribs are shallow and more slender than the original. The north side of the clerestory was entirely rebuilt. The roofs of the aisles of the choir above the vaults have been three times altered. They were first covered with lead, which was stolen by Coligny, then with wooden shingles, and afterwards with tiles. These changes caused also a difference of level, and caused the alteration of the windows of the triforium gallery, which were made circular to suit the higher roof. Those at the extreme east end were, however, always circular, and one of them has preserved part of the original tracery. The external arrangement by which the parapet and the allure, or rather the gutter, of the semi-circular apse, is carried on arches across the intervals between the apsidal chapels, should be noticed as one of singular elegance, and having a most picturesque effect.

I have mentioned that there is an erroneous tradition respecting the date of the choir, but I think that M. Bouet has hit upon the true explanation of this tradition. The confusion arises from the double meaning of the word choir, which properly signifies that part of the church in which the chorus are accustomed to assemble to chant the service; this being usually the eastern limb of the church, the

name has come to be applied to that portion of the edifice, but the two are not necessarily identical. In many churches in Italy, and especially in Rome, the choir or place for the chorus is moveable, and is changed at different seasons of the year. In England and in France it frequently extends across the transepts, and includes one or more bays of the nave; this was the usual arrangement in cathedrals, and it has been applied to many parish churches with great advantage. In St. Stephen's, at Caen, during the great repairs of the eastern part of the church in the seventeenth century, a chapel on the north side of the nave was fitted up for the use of the chorus, and continued to be used as a choir for above a century: hence the monks became accustomed to call this chapel the choir. This chapel was built by the Abbot Halbout in the fourteenth century, and is still known by the name of the *Chapelle Halbout*; it was therefore quite natural for the monks to say that their choir was built by the Abbot Halbout, for this was true in their sense of the word choir, but this tradition was afterwards misapplied to the eastern limb of the church. This chapel of Halbout is not without interest for us, though it has been much altered and spoiled. The vault is modern, and of plaster only, but in fair imitation of the old one. The side windows are flamboyant work of the sixteenth century, but the east window is either original or a careful copy, and is of the form usual in the fourteenth century in this part of France; and this is important for our purpose in studying the comparative progress of the art. The tracery consists entirely of foliated niches, almost identical in pattern with those of the Chapter-house of Westminster, which Mr. Scott has proved by documents to be of the middle of the thirteenth century. The same form occurs in the Chapter-house of Salisbury, a very few years after that of Westminster, and it is common in England in work of about 1260. It is used also in the Sainte Chapelle, in Paris, at the same time as at Westminster, but that is considered by all French antiquaries as an exceptional building, very much in advance of other buildings of the same period; and this form of tracery is considered as characteristic of the fourteenth century over the greater part of the north of France, while in England it belongs usually to the latter half of the thirteenth.

Perhaps the most striking feature of this remarkable church consists of the spires, especially those of the west front, which are amongst the most elegant of the many very elegant spires for which the early Gothic of Normandy is celebrated. There are on St. Stephen's church altogether eight spires, including those upon turrets as well as those on the larger towers, and this beautiful group of spires gives an admirable effect to the church at a distance. They are not all of the same period, nor of the same importance: the earliest is on a stair turret of the north transept; it is octagonal, and belongs to the later Romanesque work, or soon after the middle of the twelfth century. The next are two pairs belonging to the early Gothic work of the choir, and show this to be a little earlier than the western spires, as their character places them clearly between the early one and those at the west end. They are square rather tall pyramids, with mouldings on the angles, and a finial, and are amongst the earliest Gothic spires, rather solid and heavy when compared with the later examples, but much lighter and more elegant than the earlier Romanesque spires which abound in this neighbourhood. Those at the west end are, however, very superior in lightness and elegance, with pinnacles of open work at the angles and in the centre of each face. These spires are themselves light, slender, octagonal structures, rising from the tall square towers of the earlier period, and are quite models of early Gothic spires. The northern one is rather earlier than the southern, and the pinnacles not quite so light and open, but neither are they so *bizarre*, for notwithstanding the light elegant effect, it must be acknowledged that the triangular pinnacles of the southern spires are a singular caprice, and not a good construction. They have had to be renewed several times, the last time within the last twenty years; but the original design has been faithfully copied, though the details cannot be depended on. These are amongst the earliest Gothic spires, and probably date about 1230. Caen has two other spires; the celebrated one on St. Peter's church, a very elegant and beautiful example of the beginning of the fourteenth century.

octagonal with openings pierced in the flat sides, and mouldings on the angles and inner pinnacles. The remaining one (St. Saviour's) is later, and not so good. It should be observed that in nearly all the spires in this district the surface of the stone is cut to imitate wooden shingles or tiles, a clear proof that there were earlier spires of wood from which these were copied; indeed there is little doubt that all the Norman towers either had or were intended to have spires of some kind. The frequent burning of the wooden spires, and the natural decay of the material in such an exposed situation has caused them to disappear, and in England the towers have gradually been left with their square tops calling in vain for spires. In this part of Normandy, where the building stone is so abundant, and so easily worked, stone spires were very generally introduced in place of the wooden ones.

I am very much inclined to believe that Europe is indebted to Caen and its neighbourhood for that very interesting feature in Mediæval architecture—the Gothic spire of stone. I know of no other district in which we can trace such a series of steps leading up by a natural succession and progress to this object, as the pyramids which form a common termination of the church towers of this neighbourhood. Beginning with the very remarkable and curious low pyramid of Than, which may fairly be assigned to the end of the eleventh century, we can here readily trace the successive changes at intervals not exceeding ten years from each other, in a series gradually becoming more lofty, better executed, and evidently later in character, until we come first to the square spire and then by a natural and easy transition to the octagonal spire with its group of pinnacles and spire lights (*lucarnes*) at the base. To begin then with Than: in this remarkable structure the surface is not made even in one gradual slope as was afterwards the case, but the pyramid is built in a succession of steps with the angles chamfered off, and within the stones are not cut, but left rough and overhanging one another, like the Irish cairns and beehive houses, and at the base of the pyramid a large piece of timber was introduced, like the wall plate on the top of a wall, as if to bind the tower together, and make a secure base to construct the pyramid upon. This timber has now entirely decayed, and has left only the opening in which it was placed, which must tend materially to weaken the structure; the upper part of the pyramid also has long been destroyed, and leaves an open hole to admit the rain, as into a well. I am rather surprised that the excellent French Society for the Conservation of Mediæval Buildings (*Monumens Historiques*) (of which I have the honour of being a member,) has not given its attention to this curious structure. The next pyramid in date is probably that of Comornes, near Bayeux, which is in a tall tower possessing some curious features of quite the beginning of the twelfth century or the end of the eleventh. The pyramid itself is low and very early looking. It is built of ashlar, the upper part has been repaired, and has unfortunately had a window and a bell put on the top. The next which occurs to me is Basly, near Caen, which belongs to near the middle of the twelfth century, and Rosel which follows very soon after. These are simple pyramids without any corner pinnacles; the latter has a round moulding on the angles, a finial, and spire-light.

Huppeau, near Bayeux, may come next. It is considerably taller than those that have gone before, but appears to be nearly, if not quite as early. It has a large roll moulding on the angles, and the surface is cut in imitation of shingles. At each of the four corners is a sort of rude large crocket, the lower edges of the pyramid resting upon a corbel table, as is usually the case, and these corbels are very rudely carved, but the cutting is deep. Vaucelles, in the suburbs of Caen, has been repaired, but copied with tolerable fidelity, and belongs to this period. St. Loup, at Bayeux, which has been engraved by Pugin, is another very fine example of this class. St. Contest, near Caen, has also had the pyramid rebuilt in modern times, but faithfully copied, and may be classed here. Bony is a fine example of transitional character, which may be called either a very tall pyramid or a square spire; it has no corner pinnacles, but has *lucarnes* in the centre of each face.

Douvres may be taken next: it is octagonal, but very early, quite of transitional character and

stands on a tower of the same period. The small square spires at the east end of St. Stephen's, at Caen, have been already mentioned, and should perhaps come before Douvres. Ducy is a very elegant lofty octagonal spire with square pinnacles, and is a little earlier than the western spires of St. Stephen's, Caen.

The spires of the Cathedral of Bayeux are so much of the same character as those of St. Stephen's, Caen, that they were probably building at the same time. They are not equally elegant, and the corner pinnacles are not so open, which gives them rather an earlier appearance. Secqueville has a fine spire of nearly the same character, possibly a little earlier, having no corner pinnacles, but it has lucarnes, and these correspond closely with the others.

These are all the examples which occur to me as leading up to, or contemporaneous with, those of St. Stephen's, at Caen, which it is my object to illustrate by this brief comparison. A few words should perhaps now be added on the later spires of the same district.

Those of Bretteville, Bernières, and Langrunes follow in this order, and bring us to about the middle of the thirteenth century. They are all admirable examples of elegant design and wonderfully light construction, and each is of itself a study for a young architect. After these come the unfinished spires of Norrey and Aubrieu, which bring us to the end of the century. Norrey is one of the most beautiful of this district of beautiful churches; it is often said to be copied from St. Stephen's, Caen, but is almost an exact copy of the Cathedral of Bayeux* on a small scale, quite a little model of a cathedral. It was intended to be made far more rich on the exterior, but was never completed. The small portions that are finished are exquisite pieces of Gothic detail and carving, but it is of considerably later date, near the end of the century. The spire was never completed, but it is carried above the top of the pinnacles, which are finished, and show what it was intended to be. At the east end a whimsical fancy has been introduced: the two apsidal chapels have each a half spire carried up for a roof, so that they look as if the two had been split asunder, and ought to be joined together again. The effect is very bad, and even ludicrous, and this seems to show that when the architect deviated from his model he was not to be trusted, although the workmen possessed wonderful skill.

This brings us to the spires of the fourteenth century, of which St. Peter's, at Caen, is the favourite type, and which is commonly quoted as the perfection of a spire, although some prefer the earlier type, of which St. Stephen's affords the most perfect example. The spire of St. Saviour's, at Caen, would rank very high if it were not so near to St. Peter's, to which it is not quite equal.

In a very ingenious and clever essay by M. Cordier, of Caen, published in the 'Bulletin Monumental' for 1862, he endeavours to prove that the mode of construction, commonly used in Normandy and in England in all large Gothic buildings, with a double wall, is of Norman origin, and almost peculiar to the Anglo-Norman buildings. It is certainly used in Gothic buildings in other parts of France, but whether it was used at so early a period in other provinces is a question deserving of investigation. By a double wall is meant that mode of construction which consists of an inner and outer casing of ashlar, with the interval filled in with grouting, which afterwards becomes a concrete mass, and with passages left at intervals, which do not affect the strength of the wall. The inner casing carries the vaulting, and the outer casing the outer roof. Openings are left in both the outer and inner casing for the doors and windows, and the triforium arcade, but with this difference—that in the clerestory the opening of the inner casing is larger than in the outer one. In the triforium arcade this is reversed; the inner face of the wall being here the one most exposed to view. The larger opening is made at this part in the

* The church of Norrey did not belong to the abbey of St. Stephen's, at Caen, but to that of St. Ouen, at Rouen; it was therefore more natural to copy the cathedral of the diocese than the great abbey church, which was in some degree a rival to it.

the abbey church of Bernay, in the first half of the eleventh century, and at Caen, and in the Tower of London in the latter half of the same century. Was it used in other countries at the same period? A number of instances may be cited to the contrary, but these prove nothing. Double walls were of all periods. The passages in the thickness of the wall are the best criterion whether this mode of construction was understood or not. Do they occur in the buildings of other countries in the eleventh century in the same manner as they do in the Anglo-Norman buildings?

PROFESSOR DONALDSON, Past President, said they were extremely obliged to Mr. Parker for this paper, and he had listened to it with great interest, as some years ago he (Professor Donaldson) had read before this Institute a paper upon Caen, and on some of the churches mentioned by Mr. Parker. They were very greatly indebted to gentlemen who had leisure and disposition to bestow so much time in the investigation of a subject like this, for professional men engaged in the pursuits of their practice were not able to devote that time in fully carrying out such investigations. There were various points touched upon in the paper which were very suggestive. With respect to those hollow walls, it appeared to him that the great principle on which they were constructed was to get stability with less material. If they had but the same quantity of material in one thickness the wall would be wanting in that stability which was necessary to sustain the pressure which the vaulting produced upon these supports; whereas, having two thin casings, and extending the base, strength was given to resist more than would be the case with the same walls in only one thickness. With reference to precedence of style in France over that of England, his disposition was to give preference to France by about a quarter of a century; and there was in the second volume of the 'Transactions of the Institute' a paper by Mr. Poynter, in which he drew a parallel, and prepared a table showing that the buildings in France were many years in precedence of those in England. When they commenced with the Saxon period in England the style was very rude and rough; it carried out a certain amount of sentiment, but was wanting in that delicacy and finish which was introduced by the Normans after the conquest in 1066, when William came to England. After that event they found a great appreciation of nobility and beauty of form, and disposition of masses, and the greater minuteness and delicacy of details in the Norman architecture. He could not find that specialty of sentiment and feeling and expression which were considered by Mr. Parker as very distinct and different between the early pointed periods of England and of France; and looking to our best works, they seemed almost all reflections of those produced in France, which he attributed to the circumstance that the architects brought over to this country by distinguished prelates from France, (who then filled the most eminent positions in England), introduced into this country a style of architecture which was applied to some of the most elaborate buildings of that period, and tended to the diffusion of the Early Pointed in place of the Norman. It was his impression—although he might be mistaken—that the French had precedence of ourselves in respect of the introduction of new styles of architecture up to the fifteenth century. Then the divergence was evident. The English architecture of the Tudor period possessed an individuality quite distinct from the flamboyant style of France. They were much obliged to Mr. Parker for bringing these facts to bear upon such curious points in vindication of the architecture of our country. With respect to the construction of the concrete central walling there were some fine specimens of that construction in this country, and perhaps none more so than was to be found at Rochester Castle, where even the steps of the staircase were formed of blocks of concrete. There was no regularity of arching, but mere masses of concrete roughly and rudely built, held together by the goodness of the mortar and the material of which they were composed. Altogether the construction of these buildings, and Gothic buildings generally, did not show sound, substantial and correct principles of construction. They found the casing carried out very beautifully, but the squared blocks of construction carried throughout the mass of walling was not found as in the Greek and Roman works of the classic period.

The Gothic architects carried up vast piles and combinations with great skill, but in what should be solid and substantial construction, great weakness was too often found. There was a core of rough construction, faced with masonry, but not bonded into the heart of the work in regular courses, and it was this combination of different materials which caused those cracks and fissures which were unhappily found in many of the ancient buildings so constructed. He would conclude by proposing a vote of thanks to Mr. Parker for his very interesting paper.

Mr. WILLIAM WHITE, Fellow, had great pleasure in seconding the vote of thanks to Mr. Parker, and begged to offer one or two observations on this subject, more especially as he took a different view from Professor Donaldson as to the similarity of the development of styles of the two countries. He had looked into that development from time to time, as opportunity had occurred, in all parts of our own kingdom and of France, and it seemed to him that the Norman architecture of France had a character to itself which no other had. It was very special in its character, and though perhaps it was very difficult exactly to define wherein the difference consists, yet the round mouldings and hollows were found to be of a different character from what obtained in our own country. Though very much the same in style, it varied in several respects from the English style of the same period. Then again, the semi-circular arch of the Norman architecture was continued much later than in our own, as also the square abacus and the peculiar type of foliage which prevailed with it in the bell of the capital. But it did not seem strange that such characteristics should be confined to the separate localities and countries, inasmuch as it was so very evident, he thought, that the different developments of style, in the different countries, from the Romanesque, which took place according to Mr. Parker's paper, were effected by the simultaneous working of different sets of men, who working as they did from the same original data, worked alike up to a certain point, and from that point onwards again. Therefore it was so much was similar in the general form of development, though in different countries the minutiae and the details took a peculiar form, according to the habits and traditions of the local workman. He thought a great deal of the small detail was traceable to the peculiarity of the workman or sculptor himself. That was a point quite clear to his own mind, but he hoped the discussion would be continued by other members offering remarks on this question.

Mr. G. R. BURNELL, Fellow, remarked in confirmation of Professor Donaldson's view of the development of styles in France, that he met with a singular instance of the development of the Norman style in the church of Verneuillet, Seine et Oise, which was situate on the Paris and Rouen Railway, about six or seven miles from Poissy. In that church there was a remarkable specimen of the interlacing of the circular arches, which was precisely like the interlacing of the circular arches in the round tower of the Temple Church. Whilst he was making an inspection of that church he was accosted by a shopkeeper living in the neighbourhood, who asked him what date he put upon that church. He, of course, carrying the date of the Temple Church in his mind, told the man he thought the date was about 1260, when the shopkeeper replied that it was 1220. He mentioned this fact in confirmation of Professor Donaldson's opinion that the architecture of France generally preceded the architecture of England, at any rate until the introduction of the Tudor style. He might mention one peculiarity about the spires of Normandy. Almost all of them were executed in thin slabs of stone; they were all about seven inches thickness at the bottom, and about four inches thickness at the top, and they were almost all executed in the Crenilly stone. In Caen, especially, which is situate upon the great oolite, they used the Crenilly stone in their steeples, which was obtained about twelve or fourteen miles from the town of Caen.

Mr. BURGESS, Fellow, inquired whether the joints were horizontal or cut at right angles to the face.

Mr. BURNELL was not quite certain, but he thought they were at right angles to the line of the slope of the steeple.

PROFESSOR LEWIS, Fellow, (responding to the call of the President), expressed his regret at the cause of Mr. Parker's absence from England. There was, however, reason to believe that his time would be well occupied in Rome in working out on the spot the history of the remains of the Christian basilicas there, and such a man as Mr. Parker, with the actual materials of his work on the spot, could not fail to produce results of great value; therefore, though they regretted his absence in one respect, they might have cause to congratulate themselves on the work which that gentleman's enforced absence would give them hereafter. He thought the vote of thanks proposed ought to include his friend the Hon. Sec. for his kindness in reading the paper. In reference to the subject brought before them this evening, he would say he did not quite understand the view which Mr. Parker had taken about the double walls and the distinction between the Mediæval wall and the Roman. The Mediæval depended no doubt to some extent upon the stone casings, and so did the Roman, although probably not to the same extent. The casing of the Roman walls was often very strong, with rows of long bricks inserted, tying it with the body of the rubble in a very strong way, and the two were thus bound together even more, probably, than were the Mediæval walls. There was a vast number of Mediæval remains to show that the rubble hearting of the walls, where cased, was depended upon, and much of it was quite sufficient to leave a very solid wall when the external casing was stripped off; in fact, to bear the whole weight of the structure quite securely without the casing. A case of this kind of construction was to be seen in the Château of Falaise, for example. Two or three years ago he noticed that the casing of a large portion of the walling was gone, but still the walls remained solid, with scarcely a settlement, and the hearting was as strong as any concrete they could conceive. Numbers of cases of the same sort would occur to every one no doubt of any experience in Mediæval work: and there were examples in Roman (Reihburgh for instance) where the Roman hearting was very bad. With respect to the spires, he agreed with Mr. Parker that the Normans would seem to have been their chief designers. There were numerous instances of towers of all classes in the several districts of France of which the dates were tolerably well ascertained, but nothing that seemed to him to take the credit of them from the Normans. He thought the Norman towers generally gave a notion that they were intended to be finished with a spire of some sort, whether high or low. Mr. Parker's paper, if thoroughly gone into, would involve the whole question as to the priority and merits of English and French architecture, and other subjects of great interest, but it would be quite out of the question to enter upon them this evening. He most heartily concurred in the vote of thanks for Mr. Parker's interesting paper.

PROFESSOR DONALDSON added that it was interesting to observe the manner in which the octagonal spire was introduced above the square tower, so as to produce an harmonious combination. This was a notable feature in many of the Norman churches of the period to which Mr. Parker's paper referred.

Mr. WHITE would supplement the remarks upon these walls by stating that the Romans appeared to depend almost entirely upon the goodness of their mortar cement, and not upon the manner of their stonework; while Mediæval works depended so much more upon the construction of the stonework, and very often built with earth almost without lime in their rough walling.

Mr. HISCOCKS, Fellow, on the subject of outer and inner casings, warned young architects against falling into what he considered a great error of construction. He had found it so in practice. The outer casing of walls with such material as Kentish rag was a deception; and he could give instances where the walls to a certain extent were false, and when the building was carried up it was obliged to be put into a straight-waistcoat before the roof was covered in. That was owing to the principle of not bonding the outer casing with the inner portion of the wall, and which practically is not carried out. In the present utilitarian age architects generally tried to save as much material as they could, and the walls were seldom built very thick. There was no chance of buildings falling from the great thickness of the walls; but on the contrary, walls were rendered insecure by being compounded, or not built with

materials that will bond readily. He considered one-third of the thickness or strength of the wall was taken away by the use of the outer casing, an entire brick wall being the strongest.

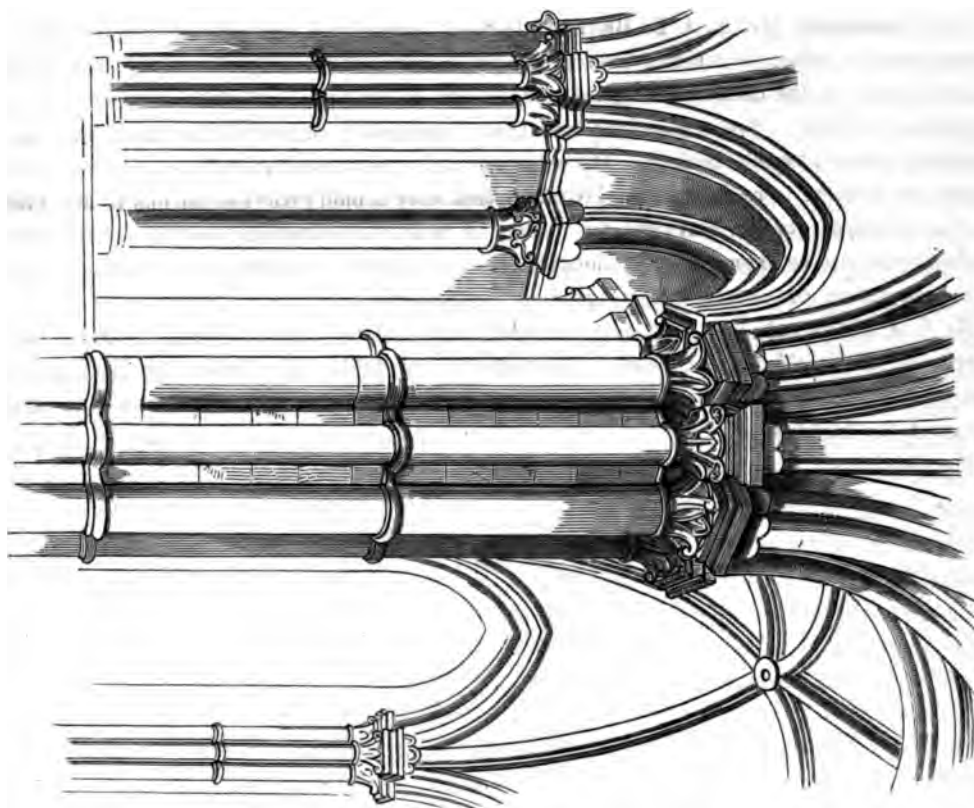
The PRESIDENT, Mr. A. J. B. BERESFORD-HOPE, considered that extremely interesting matter had been brought before the meeting both in the paper and in the discussion upon it, more particularly as to the priority of the Gothic of England and France, and the practical questions connected with the construction of walls. These questions had been legitimately raised in the paper, and had been legitimately debated by the speakers. He would not add a word to what had been said, but would now call upon the meeting to respond to the invitation that they should give their thanks to Mr. Parker for preparing the paper; to Mr. Hayward for reading it in so able a manner; and he would suggest that the vote should also be extended to M. Bonet for his very beautiful drawings in illustration of the paper.

The resolution was unanimously adopted.

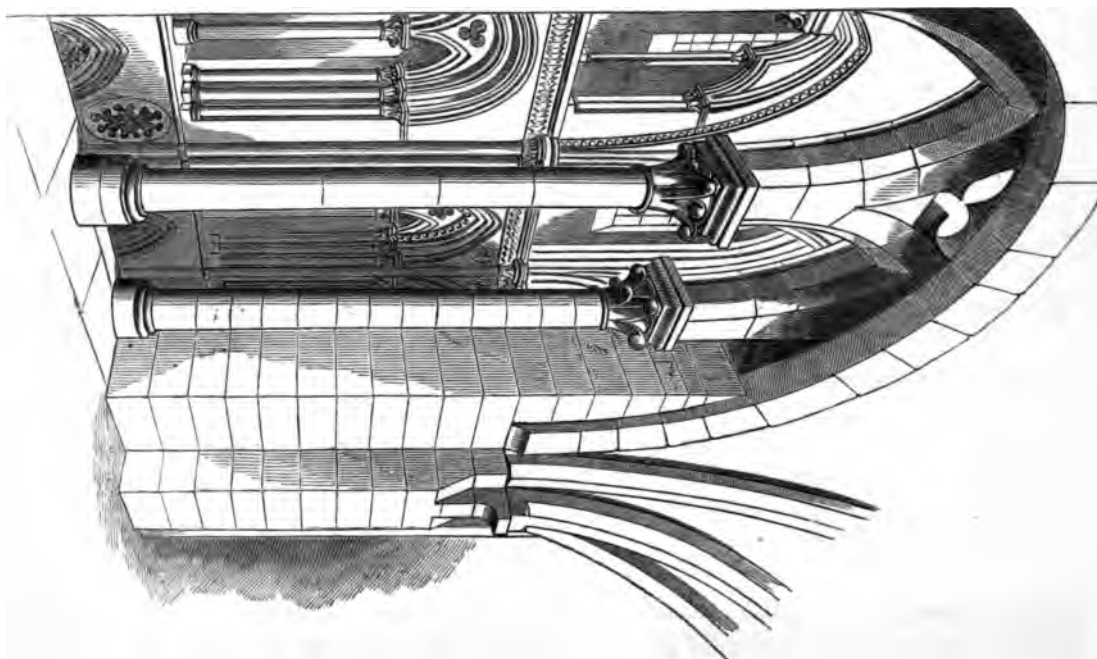
Mr. C. F. HAYWARD, Hon. Sec., acknowledged the compliment paid him for the discharge of only an ordinary duty of his office, and expressed a wish that he might be more frequently called upon to read papers by members resident in the country, who could not always make it convenient to attend the meetings of the Institute.

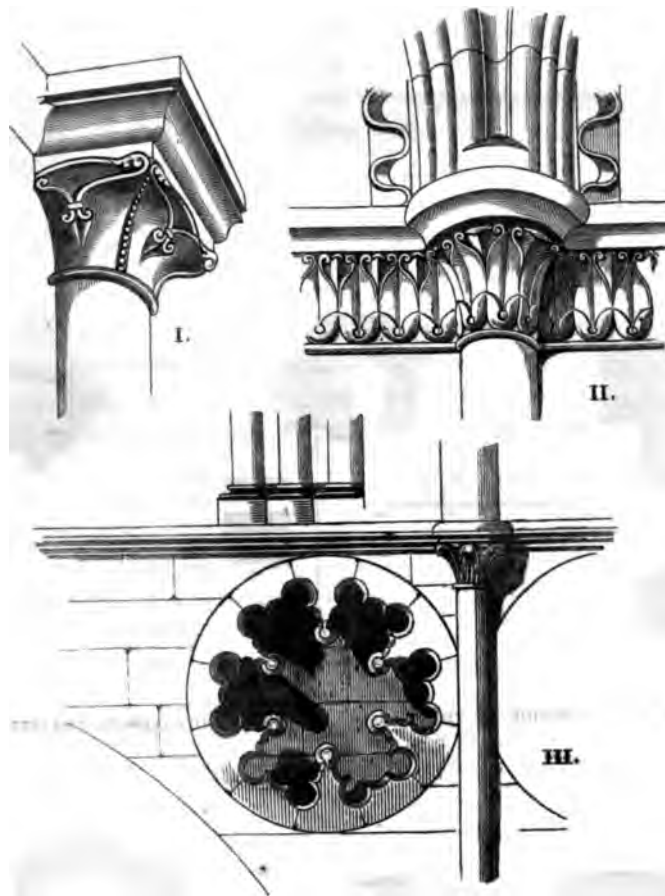
The meeting then adjourned.

APSIDAL CHAPEL.

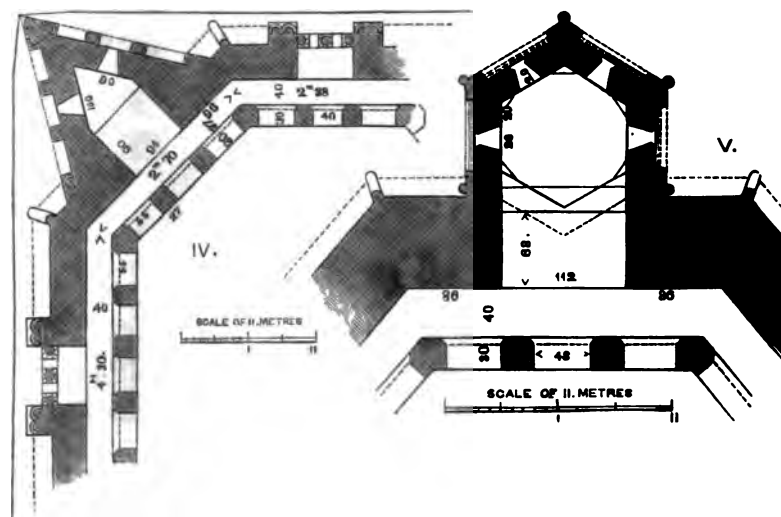


INTERIOR OF TYPHOIDUM GALLERY IN CHOR.

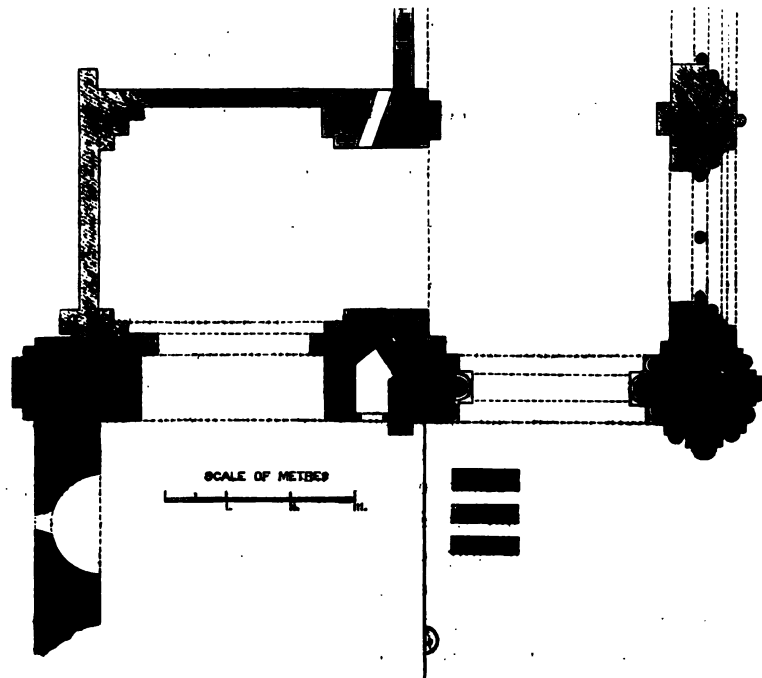




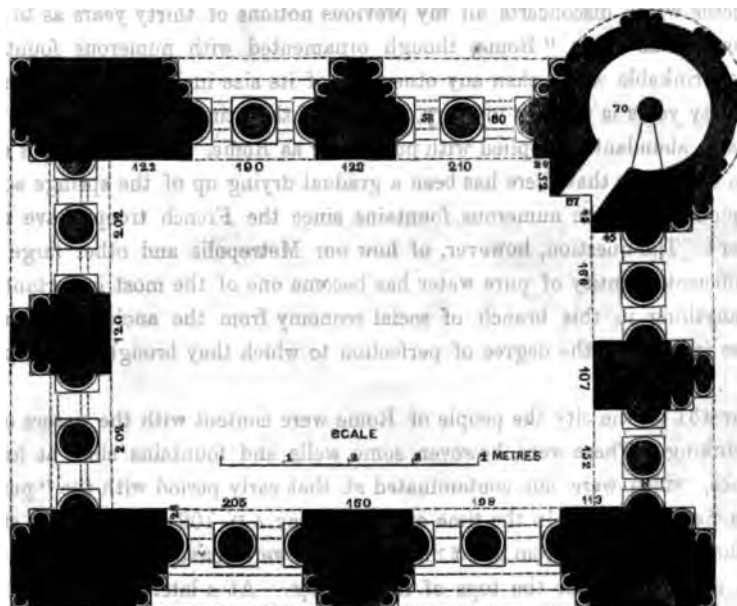
I. CAPITAL OF SHAFT IN ONE OF THE APSIDAL CHAPELS. II. VAULTING SHAFTS IN CHOIR.
III. 'ROSACES' IN CHOIR IN SPANDRILS BENEATH THE TRIPORIUM GALLERY.



IV. SOUTH-WEST TOWER. V. TURRET AT ANGLE OF NORTH-WEST TOWER.
PLAN OF THE GALLERY OF THE SPIRE.



PLAN SHOWING JUNCTION OF THE GOTHIC CHOIR WITH ROMANESQUE TRANSEPTS.



BELFRY STAGE, NORTH-WEST TOWER.

ON THE WATER SUPPLY OF ANCIENT AND MODERN ROME.

By REV. R. BURGESS, B.D., Honorary Member.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, March 12th, 1866.

It was a paragraph in one of our daily journals which suggested to me the thought of writing a paper upon "The Water Supply of Ancient and Modern Rome." It was not, indeed, necessary that I should inflict the reading of such a paper upon an Ordinary Meeting of this Royal Institute, but I have been so often, in years gone by, indulged with a patient hearing, that I ventured to propose to add one more dissertation on Roman matters to the long list which, I see to my dismay, stands under the letter B in your newly printed catalogue. The paragraph mentioned,—a Prospectus which had been issued by the Anglo-Roman Water Company, with a capital of £200,000, in shares of £20, to supply Rome with water from the springs at Arsoli,—the old Marcian aqueduct was to be cleansed and repaired, and that purest of all waters which ancient Rome enjoyed was to be brought to Rome for a high level service. Referring to the prospectus, all the advantages of the scheme were pointed out in a very able paper, not only the advantages which were to benefit the Roman people, but also those which would benefit the shareholders, my fear is that the only party that will not benefit is the Aqueduct itself, so far as it forms a grand feature in the picturesque beauty of the Campagna. It may, however, be hoped that if there be any attempt to imitate the elegant arcade of a Greenwich railway, or the light and airy construction of a Ludgate Hill viaduct, the *genus loci* which presides at the Arco Furbo will forbid the union between *Anglo* and *Romano*. But there is one observation in the Anglo-Romano Water Company's prospectus which disconcerts all my previous notions of thirty years as to the water supply of Rome. The prospectus says: "Rome, though ornamented with numerous fountains, is perhaps worse off for pure drinkable water than any other city of its size in Europe!" What can have made the difference in thirty years is to me a mystery, because at that time the universal opinion was that no city in Europe was so abundantly supplied with pure water as Rome. The only way I see of accounting for this remarkable scarcity is that there has been a gradual drying up of the springs and streams which used to flow so copiously into the numerous fountains since the French troops have encamped by the banks of the Tiber! The question, however, of how our Metropolis and other large cities are to be supplied with a sufficient quantity of pure water has become one of the most important of our age, and if we can learn anything in this branch of social economy from the ancient Romans, it may not be altogether a useless task to see the degree of perfection to which they brought this department of their social economy.

Until the year 431 of the city the people of Rome were content with the waters of the Tiber both for bathing and drinking. There were, however, some wells and fountains close at hand, and rivulets at no great distance, which were not contaminated at that early period with the "*purgamenta urbis*," which we translate "sewage;" but in the time of Trajan (say A.D. 102) nine copious streams of limpid water flowed into the city, running from great distances, and were conveyed in subterranean channels, or, wherever the level required it, over the tops of lofty arches. At a later period there were even more; but we take the time of Trajan because it was near the beginning of his reign that Sextus Julius Frontinus produced his work entitled '*De Aqueductibus Romæ Commentarius*,' from which we derive almost all our information up to that period concerning the great works of Republican and Imperial

Rome. Of modern writers upon this subject none can compare with the learned and diligent Fabretti. His dissertations, 'De Aquis et Aqueductibus veteris Romæ,' published in 1788, were written mainly to show that the Aqua Felice, brought to Rome by Pope Sixtus V, was really the ancient stream called Aqua Alexandrina, and not as was supposed the Aqua Claudia. In order to pursue his enquiries and establish his point, a matter insignificant in itself, this great antiquary spent many years of his life in the Campagna, tracing every line of ruins and turning over every brick that might lead to the discovery of a *specus* or conduit, until he was enabled to grasp the whole subject of the ancient water supply of Rome, and describe the course of every stream from its source. Fabretti performed all his journeys on a mule, which became the companion of his daily life; and it is recorded of the mule that the creature of its own accord would always stop whenever it came to a heap of ruins or a few bricks amassed together. If any such treasure escaped the notice of the antiquary, while he might be dozing at noonday as he went along (*quandoque bonus dormitat Homerus*), the mule made the discovery, and so entitled himself to take rank among all the antiquaries who refused to admit Fabretti's theory. Alberto Cassio is another modern writer who has traced the water courses, and given much accurate information on the several aqueducts.

The native rivulets of Rome were: 1. The Almo. Its course, from its head to the Tiber, did not exceed five miles; hence the apt description of Ovid, "cursu brevissimus Almo." It fell into the Tiber near S. Paul's fuori le Mure, but if used at all for domestic purposes it could only have been available for the villas, or the Vicus Alexandri on the Via Ostiensis, 3 miles from Rome. 2. The Aqua Mercurii, near the Porta Appia, which took its rise at the roots of the Cœlian and Aventine hills. 3. The Pool of Juturna at the foot of the Palatine. 4. In the Forum was the fountain of the Luperkal. 5. The warm springs, Lautulæ, at the foot of the Capitol; and lastly, the fountain of Picus and Faunus, rising from a grotto under the Aventine hill. All these streamlets and fountains put together, however, soon became inadequate to the wants of Republican Rome, and long before the Carthaginian war it was necessary to devise means for a fresh supply of water. It may be some consolation to our great companies, who cannot always see *their way* clearly to water-works and railroads, that the first aqueduct and the first great road ever constructed were done by a blind man, Appius Claudius, called Cœcus, 321 years before the Christian era. He conducted a stream of water to Rome, and constructed the Via Appia. The Aqua Appia had its source in the territory of Lucullus, at about 700 yards ("passus") to the left of the Via Prenestina, between the seventh and eighth milestones, and after effecting a distance of 11 miles 190 yards, it ended at the Salt Magazines on the Tiber, near the Porta Tregimina, and distributed its supplies under the Clivus Publicii about the Aventine hill. There were junctions in those days as well as in our own. The Aqua Appia 300 years later was reinforced by Augustus with an additional stream, brought from near the sixth milestone on the road to Preneste, and when it reached the gardens of Torquatus the stream was called Gemellæ, which in our railway nomenclature we should call the "horticultural junction." I believe there are no traces of this subterranean channel at present. Piranesi, however, thought he discovered some conduits that might have belonged to it just under the Aventine hill. The Aqua Appia, although now no longer existing, is deserving of a place in the history of the water supply of old Rome.

Thirty-nine years after the Aqua Appia (that is, in the 481st year of Rome,) the Anio Vetus was conducted to the city by Manlius Curius Dentatus and Lucius Papirius Cursor, Censors. The cost of this work was defrayed out of the spoils of the war that had been waged with Pyrrhus, king of Epirus. Manlius, having died a few days before this great work was finished, left his colleague to enjoy all the honour and glory of the undertaking. The Anio Vetus began above Tivoli, at a distance of 20 miles from Rome, and before it reached the city it had run, by a winding course through the Campagna,

43 miles; of this 42 miles 779 paces were subterranean, and only 221 paces of it appeared above ground. All that remains of this ancient "ductus" is a piece of the "specus" just visible among the foundations of the walls of the city, near the present Porta Maggiore. It would almost require the eye of Fabretti's mule to detect it; but if any one, being at Rome, is curious on the matter, let him, going out of the gate, seek a few yards on the left, not above but below, and he will discover a worn piece of black stone at his feet, trying to hide itself under the brick walls which Stilicho patched up in the days of the Emperor Honorius. The word "specus" must frequently occur, now that we are beginning to pass from the invisible to that which is more visible and substantial. I need hardly say that the "specus" is the channel through which the water runs, and although the original meaning of the word is a den or hollow under the earth, it came to mean the subterranean cavity through which the water ran, and it is in this sense a "Vitruvian term." The "specus" was not always of the same dimensions. In the Claudian aqueduct it was 4 feet 8 inches wide, 6 feet high, and the flanks were 8 feet thick. This thickness was composed of three distinct strata, which, according to Vitruvius, ought always to be where water had to run through, or stand upon the flat roofs of houses. The first of these strata was a thick coating composed of pounded coarse materials, *cocciopesto*, as the Italians call it; the Vitruvian name for which was *opus signinum*. The second coating was called *opus spicatum*, and consisted of small bricks like wedges, laid transversely, and resembling the object from which the name is derived, *spica*, an ear of corn. The third or upper coating was coarse mosaic for the terraces of houses, but a kind of mastic, called *opus mixtum*, for water courses. This preparation was so complete, that no water if running through the "specus" for a thousand years could ever affect it; on the contrary, so far as the waters that ran to Rome were concerned there was a fourth coating from the calcareous deposit, which now after some 1800 years may be seen on the interior sides of the now dry channels, and the remains of reservoirs into which they poured their streams. During the sudden snow storm which came upon us a few weeks ago, when I saw some of my ceilings begin to change colour, I longed for three things, after the manner of the ancients, to keep me dry, viz., the *opus signinum*, the *opus spicatum*, and the *opus mixtum*; and I am glad of this opportunity of recommending all young architects to underdraw the roofs of all houses they build with the Vitruvian composition. Now, dry as this subject is, it was needful I should show you how to keep out humidity, and if you want to see how effective the Roman method of securing dryness was, you go the next time you are at Rome and examine the Cente Camarelle of the Villa of Hadrian, near Tivoli, and you will see that although a perpetual moisture soaks into the hill against which these chambers are placed, every inch is at this day as dry as when they were first built in the reign of Hadrian. Having now, I trust, got a comfortable idea of a "specus," let me return to the "Waters."

The two waters in their subterranean courses already described seem to have served their purpose for more than 125 years, but at the end of that period the channels were found to be damaged, and private individuals had begun to filch away the supply before it reached the city. The remedying of this evil fell to the lot of the Prætor Quintius Martius Rex. Besides regulating the old subterranean channels, he made the grand aqueduct which for ever after was called the Marcian; this is the water with which the Anglo-Roman Company propose to refresh modern Rome. The Aqua Marcia had its springs at the distance of thirty-six miles from the city: at the thirty-third milestone on the Via Valeria there is a diverticulum, or cross road, on the right as the traveller goes from Rome, and three miles on that road, which is the Via Sublacense, are those springs. They are about a mile from Arsoli, and behind the Church of S. Maria; after appearing above ground they very soon lose themselves in the foss of Riofreddo; from thence the Aqua Marcia assumes its name and begins its course from the Mount S. Elias. Pliny thus speaks of the Aqua Marcia: "*Clarissima aquarum omnium in toto orbe*"

frigoris salubritatisque palma præconio Urbis Martis est inter reliqua Deum munera Urbi tributa." This great gift of the gods to Rome is now conceded to six Directors, with power to add to their number, and no doubt there are two advantages which no one can deny, the springs are never failing (connected as perhaps they are with the Fucine Lake), and the water is the purest that Old Rome ever drank. The whole length of the course of the Aqua Marcia was 60 miles 710 passus, of which 6 miles 463 passus were carried over arches, as it approached the city. They are the remains of those lofty arches which produce such a striking effect in the Campagna; they may be followed for two miles without interruption on the road from Rome to Albano, beginning beyond the "Tavolato" at about four miles from the Lateran; they are built of peperine stone. The "specus," is in many places still perfect, though no longer used. Over the same arches two other waters were conveyed, the Tepula and the Julia, the third being the highest; the "specus" of the Tepula is still discernible in several places. This water was introduced by the censors Cn. Servilius Cæpio and L. Cassius Longinus, in the year of Rome 627, that is twenty-one years after the Aqua Marcia. It took its rise in the Lucullan territory, or as it is sometimes called the Tusculan. To arrive at its source it was necessary to go ten miles on the Via Latina, and then turn off to the right for two miles; it was called Tepula because of its being rather warm at its source, Quasi "tepida:" we shall see its channel aloft at the Porta Maggiore. The Aqua Julia, carried over the Marcian aqueduct also, was the topmost, but except at the place where the channel begins to emerge from the ground there are scarcely any remains of this "specus." The Aqua Julia was a spring discovered by Agrippa when he was Cædile (U.C. 719), about two miles above the source of the Tepula; he called it Julia in honour of Augustus. The length of its course was fifteen miles 427 passus, of which seven miles were carried over the Marcian arches. The Aqua Crabra had originally flowed into the Julia, but it was turned off by Agrippa as not sufficiently pure, and he gave it to the inhabitants of the Tusculan territory.

The five waters whose courses have now been sketched, all entered Rome on the south-east side, but in coming to the sixth and seventh, in chronological order, we must look towards north-east. After Agrippa had conveyed the Aqua Julia over the Marcian Arches, he brought another stream of the purest water to the city which has proved to be a durable monument to his memory, for it is the same which at this day feeds the Fountain of Trevi. The source of this water is near the Torre Salone, about eight miles along the ancient Via Collatina, and near the River Anio; it is all subterranean, except 7400 passus, and it had effected a course of nearly thirteen miles before it reached the city; it was carried over a ductus which began at the gardens of Lucilius and ended in the Campus Martius, and from thence supplied the baths of Agrippa. It enters Rome by the Muro Torto, near the Flaminian Gate, and runs under the garden belonging to the church and convent of the Trinità dei Monti, at a great depth. In the Via della Stamperia, vestiges of the ancient aqueduct may be traced behind the houses, and in the Via del Nazareno, by descending into a washing house, where the *Stiratrici* at work are particularly obliging, the original arches may be seen; but still more perfect, in the courtyard of the Bufalo Palace, a large and legible inscription, written on Taverline stone, leaves no doubt of the antiquity and identity of this aqueduct, that "Claudius Cæsar made and restored those arches, that had been disordered from their foundations;" from the vestiges of some mouldings and ornaments on these arches it may be inferred that in this place was one of the "*Salientes*," or fountains, of which Agrippa made so many in the city. As this work was begun only twenty years after the death of Cicero, it may almost be classed among the few existing monuments of the Republic. From the Palazzo Bufalo, and washerwomen's lavatory, it is but a short distance to the beautiful Fountain of Trevi, where the waters sport and play among tritons, nereids, and other sea nymphs, superintended by Neptune in a dignified attitude. Agrippa at first gave the name of Augusta to this water, but later

the traditional story related by Frontinus prevailed over the imperial title. When some of Agrippa's soldiers were wandering in the territory of Lucullus, and became greatly distressed for want of water, a young damsel led them the way to this delicious spring. A small little temple, *Ædicola*, was built over against the source, and a painting upon the wall represented the young virgin in the act of conducting the thirsty soldiers to the place. The stream to which Rome has been indebted now for nearly 1900 years was called the *Aqua Virginis*; it is one of the three ancient waters which now supply Rome, and it furnishes the inhabitants of the *Campus Martius*, and the quarter of Rome where foreigners prefer to sojourn, with 66,000 cubical metres of the purest water every twenty-four hours. This aqueduct has received particular attention from the popes, from Nicholas V. to Benedict XIV. In the place where it issued from the channel, Nicholas V. made a fountain with three mouths in the places where three ways met, called a *Trivium*, hence *Trevi*, as the *Rioni* or ward is now called. Benedict XIV. made the famous fountain as it exists at this day. The next, which is the seventh aqueduct in order, was the work of the Emperor Augustus. He first conveyed a stream from the *Lacus Alsietinus*, situated six miles and a half to the right of the *Via Claudia*, at fourteen miles from Rome; its course effected 22 miles 172 paces, all subterranean except 358 paces. This was the water-course afterwards adjusted by Trajan, who introduced a new stream from the Lake *Sabatinnus*, now the *Lago Bracciano*; this is the water now called the *Aqua Paolo*, and it supplies the fountains of St. Peter's, the Vatican, and the whole of the *Borgo*. Rome is indebted for this great supply to Pope Paul V. (*Borghese*). Fontana was the architect of the splendid fountain which receives and gives out every twenty-four hours a mass of 94,000 cubic metres of water. As late as 1828 Leo. XII. found it necessary, on account of a great drought that summer, to reinforce the Pauline Fountain with a new supply of water from the ancient *Lacus Alsietinus*. But this was not the only waterwork which Augustus gave to the city: he put an additional streamlet into the *Aqua Marcia*, and he took a branch from the *Anio Vetus* which he called the "*Specus Octavianus*." It also appears from the inscription to which I shall now allude, that he repaired the channels of all the waters, that is to say, of the seven which have now been enumerated.

It was Caius Cæsar Caligula who discovered that the seven streams which already supplied the city were insufficient for the increase of luxury and population, and he began to make two new aqueducts. He did not proceed far, but his successor, Claudius, continued and splendidly finished the work in the fifty-first year of the Christian era. From two springs called *Coeruleus* and *Curtius*, the *Aqua Claudia* was supplied; their sources were at a distance of thirty-eight miles from the city, on the *Via Sublacensis*. The whole length of this wonderful aqueduct was 46 miles 406 paces, of which 36 miles 210 paces were subterranean; the remaining 10 miles 176 paces were carried over arches, of which a length of 6 miles 491 paces are seen as they approach the city. It was into this aqueduct that Pope Sixtus V. conveyed his *Aqua Felice*, which begins near the *Osteria dei Pantani*, at about fourteen miles on the road to *Præneste*. But it was not the *Aqua Claudia* which was so brought to Rome, Fabretti's treatise was written to show that the *Aqua Felice* is the ancient *Aqua Alexandrina*, yet to be mentioned. The last of the nine waters described by Frontinus was the *Anio Novus*, brought also by Claudius; it took its rise on the *Via Sublacensi*, at the forty-second milestone, it was indeed a portion of the River *Anio*, as its name implies, and called *Novus* to distinguish it from the old *Anio* conveyed to Rome 312 years earlier—it was the new river. We have one which, as you know, flows through the green pastures of *Middlesex*. The *Anio Novus*, before it began to flow in its "*specus*," was purified by means of a "*Piscina limaria*;" it effected the incredible distance of sixty-two miles, forty-eight of which were subterranean. The arches above ground rose sometimes to the height of 109 feet. The remains of these, viewed with the *Marcian arches*, stretching over the "*marble wilderness*," form the most picturesque and striking object in the *Campagna*.

At the Porta Maggiore was the concourse of waters; the Anio Novus was the highest stream of all the nine now enumerated; the "specus" may still be seen above the large inscription of the entablature, next below it the Claudia; the Julia was the third in order of elevation, the Tepula the fourth, the Marcia the fifth: next in descending the Anio Vetus, the Virginis, the Appia, and the Alsietina, the lowest. We have now no longer Julius Frontinus for our guide, but we have Fabretti and Alberto Cassio for our commentators. Frontinus does, however, mention those arches of splendid brickwork which cross the Coelian Hill, and conveyed the supply of water to Nero's "Golden House" and gardens, and later, for the use of the Colosseum. They are the Arcus Neroniani, and are still a conspicuous object to be seen near the Lateran. I will not trouble you with the short branches made by succeeding emperors for local convenience, but only add a notice of the Alexandrian Aqueduct, constructed by Alexander Severus, A.D. 212; some of the remains of this last great watercourse may still be seen on the Via Labicana, at no great distance from the Torre Delle tre Treste; its length was twenty-two miles, and its arches in some places were seventy Roman palms high. It was the stream which run through this aqueduct that Fabretti insisted was the water which Pope Sixtus V. conducted, with the skill of Domenico Fontano, to Rome, in 1586, making use of the Claudian Aqueduct for that purpose. He gave it the name of *Felice*, from the first of his own names, *Felice Peretti*. With the energy with which that pope, called sometimes the Augustus of Modern Rome, performed all his great undertakings, he employed upon the construction of this work never less than 1000 labourers at a time, and sometimes as many as 4000 or 5000. It entered Rome near the Amphitheatrum Castrense, and followed its course along the walls to the Porta Maggiore, and is now to be seen passing over a *ductus* of three arches, erected by the same Pope, at an elevation of 48 metres above the level of the Tiber; it supplies the more elevated parts of Rome, feeding first the fountain of S. Maria Maggiore; it runs towards the Viminale and Quirinale hills, supplying the great fountain at the Piazza dei Termini, and those in the Piazza Barberini, and at the Quirinale Palace; then it pours its waters into the fountain on the Campidoglio, and proceeds towards the Aventine, serving the south side of the Forum, and at the Bocca della Verità, and also the Quarters of the Jews. It furnishes 20,537 cubic metres every twenty-four hours, but it is not equal in quality to the others. The three waters, then, which now supply Rome were anciently the *Aqua Virginis*, now Trevi; the *Aqua Alsietina*, now the Aqua Paolo; and the *Aqua Alexandrina*, now the Aqua Felice; and these three streams pour into the city of Rome every twenty-four hours, according to Melchiorri, 180,537 cubic metres of pure water. This is about a cubic metre per diem for every single inhabitant (a cubic metre is more than our cubic yard); if this be so, I do not see my way to take any shares in the proposed new water supply, for it appears to me that already that supply is not like the New Water Company—"limited."

The three waters Marcia, Julia, Tepula, were conveyed in their several channels over one aqueduct, the Marcian; and at the Gate of S. Lorenzo, anciently the P. Tiburtina, which is now nearly on its original level, the aqueduct is seen, but interred up to the spring of the arch, and yet exhibiting the three "specus" distinctly. The entablature which is rent in many places still exhibits the inscription of Augustus, Titus, and Caracalla; but the great concourse of the principal channels was at the ancient Porta Prenestina, now the Porta Maggiore, where seven waters without mingling flowed towards this gate. I need not enumerate them again, and it was no doubt on account of this concurrence of aqueducts that the magnificent frontispiece which is so familiar to us in the drawings of Piranesi and others was erected here, and the inscriptions which are read on the lofty entablature made to record the acts of imperial magnificence (see the drawing or sketch). But I must hasten on, though leaving much behind, and ask your indulgence for a few minutes more to see if we have anything to learn from the mode in which

those waters, when brought to the city, were managed. The several waters were first poured into a reservoir for purging them, called "a piscina Limaria." The waters were allowed to settle for a time in a Piscina until the calcareous matter held in solution was deposited, and then the water was let out to pursue its course; after running some distance, the water fell into a "Castellum aquæ," (a Château d'Eau.) This castellum aquæ received the supplies of several aqueducts, and discharged a portion of the water into a large basin very much resembling the present Fontana Paola on the Mount Janiculum. There is now existing a mass of ruins not far from the Church of St. Eusebius, on the Esquiline hill, where anciently the two roads Proenestina and Labicana met: these ruins are commonly called the Trophies of Marius. Tradition has sanctioned the name arising from two sculptured marbles which were found, and which now stand on the balustrade of the Campidoglio, one of them has a cuirass with its ornament and shield, with a young barbarian bound as a captive; on the other various instruments of war are sculptured. This ruin was generally believed to have been a *Castellum Aquæ*; it received, perhaps, two of the streams at least that arrived at the Porta Maggiore. It was a convenient situation for a supply of water, whether it be called a Castellum or an Emissarium. It is clear from excavations that have been made that there were water conduits conveying the supplies to different parts of the city. The plan which I here present of this great fountain is not imaginary; the elevation is in a great measure authorized by a drawing made in the middle of the sixteenth century, when the ruin was more perfect, and is found in the work of Benardo Camucci. At that time the trophies stood in their recesses, and some of the architectural ornaments were remaining. [By reference to the plan, it will be seen that the water being first divided by the round projecting buttresses, were distributed into five channels, and then through as many issues poured itself into a vast reservoir as represented in figure 2.] It must have been one of the greatest ornaments of the city, and appears to have been richly ornamented. Some of the most celebrated statues of antiquity have been found near it, and may have belonged to its embellishments, viz., the Adonis or Meleager of the Vatican, the Discobulus, the Seneca of the Villa Borghese, and others mentioned in the Memorials of Flaminius Vacca; so that before the waters were sent forth through the conduits for the use of the inhabitants, they were made use of for the ornament of the city, and as they went along they were laid under contribution for lesser fountains called "Salientes," the whole was regulated by officers appointed for the purpose. The person that had the oversight of the "Castellum Aquæ" was called a *Castellarius*; it was his business to look to the proper quantity of water which the aqueducts under his charge had to supply. Fabretti found two inscriptions which throw light upon the economy of water; the one is a *Castellarius* of the Aqua Claudia, the other of the Aqua Marcia. He allowed the water to run for a certain number of hours for the public supply, and then kept his reserve in the proper castellum or piscina. A certain Aufidianus had charge of two waters, and, as the inscription has it, they were to run "ab horâ secundâ ad horam sextam" four hours, and all the inhabitants knew when Aufidianus let out his streams. The *Castellarius* was a superior officer, and not a common turncock; this term would rather suit the more menial office of *Aquarius*, as may be inferred from Juvenal: *veniet conductus Aquarius*. These *aquarii* or turncocks had to be careful in measuring out the water in proper quantities, whether for public or private uses, so many *quinarie* were to be accounted for, and Frontinus has furnished us with six tables showing how the water was dispensed. From the Marcian channel were dispensed 269 *quinarie* outside of Rome in the name of Cæsar, that is, it was an imperial grant, and 568 for private individuals, and the 1098 remaining were distributed over ten regiones or wards in fifty-one Castelli, and so of the rest, showing how carefully this department of social economy was managed; and yet the waters were made to subserve the ornament of the city before given for the use of its inhabitants. From the castella the water was distributed to public and private uses, under the care of the *aquarii*, but the details of this

operation, as given by Frontinus, are not very clear. The water seems to have been measured or estimated—first, according to the size of the pipe; and, secondly, by the time allowed for the running. But these pipes did not convey the water into the houses as we have it, but it was poured into small reservoirs called “*lacus*,” of which there were a great number in each of the fourteen regions. In the Cœlimontan region alone there were sixty-five; the *Balinie* also were very numerous, many of them private, but some public and extensive, the next after the *Thermæ*.

Frontinus when he entered on his office of *Præfectus Aquarum*, found there was much waste and fraudulent abstraction, householders sometimes slyly tapped the pipes, and bribed the *aquarius* to deliver a larger quantity than was due into a private pipe, or by opening new supplies, without closing the others in proper time. The *Præfectus Aquarium* tells us it required his ceaseless vigilance to prevent these honest men from selling water on their own account. There are many very curious circumstances connected with the water works of old Rome, which it would take too much time to enumerate. We have already found some things worthy of our imitation. Instead of constructing an immense open reservoir for dead and decaying animal and vegetable matter to find its way and decompose, the Romans had all the *specus* and *limaria* covered. Vitruvius lays it down as a rule, *cæque structuræ conformentur ut minime sol aquam tangat*, let them be arched over, so that the sun may on no account touch the water. Again, instead of letting the water pass at once into the cisterns or reservoirs, why not let us have fountains or cascades in the city? See how beautifully the streams would fall from the high level of the New River, down to the City, and through Regent’s Park to Piccadilly, giving out clear springs by the way. We should have a Frontinus, or Prefect of the Waters, and include him in the New Reform Bill to-night, with a seat in the House to answer all questions about the supply of the metropolis. Why should we not have a *Castellarius* or inspector of fountains, to whom all complaints of turncocks or *aquarii*, leaving your house for half a day without your *quinarie* of water. If, as we are told, there is some scheme for *introducing* a system of water into our metropolis from purer sources at a great distance from the City, let there be some attention paid to the ornamental power of water, for the quantity will be no less for use if it passes through fountains and waterfalls before it reaches its destination. There is yet a great work to be done in this most important department of our social science. We have made some progress in getting light into our dwellings, and some of our industrious citizens are beginning to admit air into their bed rooms. The third element of good water, when added to air and light, is capable of creating a more cheerful existence.

The CHAIRMAN, Mr. T. HAYTER LEWIS, V.P., said there could be no question that the thanks of the meeting were eminently due to Mr. Burgess for his very able and interesting paper, and he, hoped that some gentleman would introduce that motion by some observations bearing on the subject.

Mr. G. R. BURNELL, Fellow, said he had brought with him a copy of an article, published by M. Rosat de Mandrey in the ‘*Annales des Ponts et Chaussées*’ for September and October, 1858, “On the Ancient Aqueducts of Rome, described by Frontinus,” and which also gave a description of the supply of water to modern Rome. He was much struck with Mr. Burgess’s account of the Anglo-Romano Water Works Company, which certainly appeared to him a most extraordinary statement. The supply of water to old Rome appeared to have been 332,310,000 gallons per day, while the supply to modern Rome was 196,240,000 gallons per day. The population of ancient Rome was at the outside about 1,000,000, while that of modern Rome did not exceed about 200,000. Really the operations of the Water Works Company in that case seemed to be most preposterous; inasmuch as the proportion of water now delivered in Rome was very largely in excess of the quantity delivered in London at the

present time; for the London Water Works Companies were only entitled to draw about 100,000,000 of gallons per day from the River Thames, and that would be about half the present daily supply to London. The population of London, which was 3,100,000, therefore could not command a greater supply than the population of Rome did at present. In the book to which he had referred, a great deal of interesting information would be found on this subject.

Mr. GRANT, Visitor, thought the population of ancient Rome had been under-estimated, as it had been stated by various authorities at 3,000,000, 4,000,000, and 5,000,000.

The CHAIRMAN remarked that the question of the population of ancient Rome was a very disputed one.

Mr. G. R. BURNELL, Fellow, might be allowed to demur a little to the suggestion of the author of the paper with reference to the office of *præfectus aquarum*; for he did not think in the present day that any ornamental organisation of fountains could be tolerated in London. He meant he did not think we were a people who could essentially call for the organisation of public fountains in our streets, and for this reason, that public fountains must always diminish the head of water. What they wanted in London was some system which would maintain the head of water to the point of delivery, which of course could not be obtained if they disposed of the head in the fountains which would deliver the water at the level of the lowest parts of the streets. He did not think an organisation of fountains could be carried out in the metropolis consistently with the wants of the population in respect of the water supply.

The CHAIRMAN remarked that those acquainted with the fountains of Rome must be struck with the observation of the late Sir Robert Peel, in reference to Rome—that he was fond of fountains, but did not like squirts. Looking at the body of water that was poured through the fountain described, (of which the drawing was exhibited), and many others in Rome, compared with that which was thrown up through even the best fountains in London, the observation came home to them. He should be glad to know whether there was any gentleman present who had been in America, and could give the meeting a description of the greatest aqueduct of modern times there—the Croton at New York.

Mr. W. A. BOULNOIS, Fellow, said he believed the object contemplated by the Anglo-Roman Water Works Company was the supply of the city of Rome with water on a system convenient for the purposes of domestic life, so that people could use their own taps and obtain something of the abundance of water which existed within and around Rome, without the trouble of seeking it down at the level of the fountains, which was the case at the present time. No doubt the amount of water which ran to waste at Rome was quite sufficient to supply even London itself; but it ran so entirely to waste, and was so unavailable for practical purposes, that it seemed to be considered worth the while of an English Company to provide means for taking some portion of that water, and storing it at a level sufficient to give a head for supply at the points required; and he hoped they would succeed in showing that the utilitarian purposes sought to be effected in that undertaking would be even superior to the ornamental ones which had been suggested. The great feature of the thing he believed would be that the Romans (who were known to be a very dirty people in themselves, and who gave for the most part a very inefficient supply of water to their visitors,) should be able to furnish something like an adequate supply for the performance of the matinal toilets to their visitors without grudging it. By the present system they had to let down a pail along a rod which led to the fountain in the court below, and when filled the servants pulled it up by a cord passing over a small pulley to the level of the floor where it was required, whether second, third, or fourth floor. There it was emptied into a receptacle provided expressly, or perhaps used for the culinary purposes of the house. That was a process so primitive that one would be glad to see a change of the system. Therefore, while agreeing with what had been said as to the

desirability of employing the waters of Rome as far as possible for ornamental purposes, he at the same time hoped cold water would not be thrown upon the company which contemplated the utilisation of a large portion of the present supply of that city, which now ran to waste.

The REV. R. BURGESS, B.D., Hon. Member, had no wish to throw cold water upon the Anglo-Roman Company. They were about to convey a stream of the purest and coldest drinkable water that old Rome ever had, and the springs near Arsoli were never failing. With regard to the quantity of water now supplied to Rome, he had stated upon the authority of the Marchese Melchiorri that 180,500 cubic metres of water were poured into the city every twenty-four hours. Taking, therefore, the population at 180,000,—for when the French army left there would not be more,—that was one cubic metre daily for each person. Imagine a tub more than a yard square as the water supply to every individual in London! That would be equal to 222 gallons per day each person. Therefore, as to quantity the operations of this Company did not seem to be called for; but it was in the matter of quality of water that it might rather look for commercial success. He had no wish to speak of the Company in disparaging terms. First of all it was to be a high service; it was to bring the water through one of the loftiest aqueducts; it would serve all the upper parts of the city, where at present there was a deficiency. In the next place the water they were to supply was of the best and purest quality; therefore he conceived persons would have recourse to that water for drinking purposes, and probably the Company might pay a fair dividend to the shareholders. The only thing he hoped was, that they would not destroy the picturesque beauty of the existing aqueducts, which at present formed so charming a feature in the landscape in the Campagna. With regard to the population of old Rome, the Chairman had rightly said opinions were very various. He had his opinion on that subject, which he had taken some pains and trouble to arrive at. He had endeavoured to make an estimate of the real population of Rome at the time of the Emperors Valentinian and Valens, A.D. 364. There were two documents of the above date, one by Publius Victor, and the other by Sextus Rufus, which consisted of a catalogue, prepared by those two Consular men, of the number of public buildings and habitations in Rome. At that time the dwellings were of two descriptions, the one called *insulæ*, or blocks of houses, but "isolated" from one another by an alley running round them; the other was the *domus*, or house of the great men, which contained the family, including the freedmen and slaves and other dependents. Taking a fair estimate for the *insulæ* and the *domus*, his calculation was—for which he had the authority of the Abbé Brottier—that Rome at that time contained a population of 1,104,000 inhabitants; but as to the large number of four or five millions he was convinced that was a grand mistake. Tacitus mentioned the number of Roman citizens as being 4,000,000, but that was the number of those who possessed the rights of citizenship in the whole empire; and this had been erroneously taken for the population of Rome. His own belief was that Rome never contained more than 1,200,000 souls; and making the calculation of water supply upon the basis of that population, they would see how abundant that supply was. All the aqueducts at one time would furnish old Rome daily with about 1,444,000 metres, more than a metre for each person. He believed the inhabitants of the modern city were now as well supplied with water as old Rome was. It must not be supposed that the aqueducts he had noticed, and which were mentioned by Frontinus, were all that existed in Rome; for Procopius speaks of fourteen as existing in his time, and others tell of twenty-four channels or aqueducts. He had forbore to allude to them; but if at a future time they were desirous of having more on the subject, he might be induced to give them the history of the later aqueducts, and show that their failure was a principal cause of the decline of the city.

Mr. THOMAS MORRIS, Associate, remarked that so far as they might take ancient Rome as an example for imitation in modern London there seemed to have been one good principle adopted,—that

was, to collect all the water for the use of the city that they could bring to it. But the Romans were not over scrupulous as to quality. Members saw, in the diagram on the wall, the three aqueducts at different levels in the same construction, and not only were they at different levels, but each carried a different quality of water. Though it might be a laborious work to bring pure water to London in greater quantity than at present, it would not be so difficult, and would be attended with advantage to the population, if extra water of any quality almost were brought here to be used for inferior purposes. When they measured in round numbers the water supply to the city, and divided it by the number of inhabitants, it would perhaps be regarded as a large quantity. If it were appropriated to drinking and other personal uses exclusively, it would be one thing; but if they distributed that quantity for the general uses of the population it was a very different matter. He thought, therefore, that if the quantity could be enlarged for manufactures, watering roads, extinguishing fires, and other purposes, there would be economy in the case of London in leaving the pure supply entirely for personal uses. He wished just to ask Mr. Burgess whether, in his opinion (he, Mr. Morris, did not suspect the ancient Romans of using pumps) they were ever known in the ancient Capitol to have a jet of water thrown freely up? He could quite understand that they had an abundant overflow from the basins of the fountains, and that water ran from them in great profusion; but what he wanted to learn was, whether they had any upright jets of water, say, something in the manner of those at Trafalgar Square?

The REV. R. BURGESS said, Pliny asserts that the Romans knew that water in a close pipe would rise to the level of its source, *subit altitudinem exortus sui*; and there was an instance in Rome which was some proof that they were acquainted with the springing-up fountain. Near to the Colosseum there was a conical mass of ruins, which was originally the fountain called the Meta Sudans. Meta was the stone boundary at each end of the Spina in the Circus, round which the chariots ran, and the fountain was shaped like the Meta; the spray fell down the sides, which gave the idea of a perspiration. Whether the foam, Sudans, was produced by pouring out at the top or with a jet nobody could tell; it was a doubtful question; but the general opinion was that the Meta Sudans was a kind of Trafalgar Square fountain.

Mr. BURNELL called attention to the fact of the existence of a very large syphon at Lyons, which descended, he believed, about 200 feet in vertical descent, then passed off on the down side nearly at the level that it started with, which proved that the ancient Romans knew as much about the principles of hydraulics as we do.

The CHAIRMAN remarked that there was a passage in Vitruvius which showed that very clearly.

A vote of thanks was then unanimously passed to Mr. Burgess for his paper, as also to the President for the Memoir he had furnished of the late Dr. Whewell.

AN ENQUIRY INTO CERTAIN PRINCIPLES OF ARCHITECTURAL PHYSIOLOGY,

BY D. O. EDWARDS, M.D., M.R.C.P., F.R.C.S.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, March 26th, 1866.

IN addressing this learned Society, I cannot find a fitter apology for my intrusion into a province of science apart from my own, than the declaration of Cicero, in one of his orations, that all the arts designed for the welfare of man, have a close relationship with each other. "Omnes artes," he says, "quæ ad humanitatem pertinent habent quoddam commune vinculum; et quasi cognatione quadam inter se continentur."

The contemplation of this general alliance between the various industries which, like so many different coloured threads, are interwoven in the great loom of social life, naturally yielded him the keen intellectual pleasure, associated with the apprehension of a philosophical truth, and evidently enticed him into speculations as to the affinity of the arts, as well as to the tendency of each to elevate or depress the moral dignity of the human being. Civilization had not then awakened to the perception of the modern ethical maxim, that all labour is worthy of respect; and fettered by the narrow prejudices of class, the great orator indulged in illiberal comments upon various inferior handicrafts which he considered derogatory to the character of their professors. It is remarkable, however, that he selected architecture and medicine as worthy of special commendation, on account of the moral and intellectual excellence which they call forth. He brackets both arts together in their description, as "Artibus quibus aut major prudentia inest, aut non mediocris utilitas quæritur."

I will not presume to waste the time of my present audience in further quoting the opinions of Cicero as to the comparative merits of the two professions, or in comments on his ample means of forming a correct parallel, but proceed at once to a consideration of what must evidently have been in his mind, the nature of that *quoddam commune vinculum*, that particular technical bond of union between medicine and architecture, represented in the common purpose contemplated in the physician's prescription, and the architect's constructive skill. There can be no doubt that the members of any profession would be sometimes enlightened if they could occasionally divest themselves of their habitual modes of thinking, and take a view of their proceedings from the stand-point of a neighbouring art. As the physician would be helpless without the aid of the architect, so the architect might derive useful hints from the experience of the physician.

In the remarks which I now venture to make, I of course regard the functions of the architect from a medical point of view; but whilst assuming a freedom of discussion, necessary in the investigation of truth, I beg to disclaim any tone of dictation, and advance my statements and conclusions as so many questions to be answered by the fuller knowledge of my audience.

The means employed by the two professions are widely different, but the end is the same, namely, *to aid nature in preserving the natural standard of heat in the body, which is the primary essential attribute of life.* The infant, before birth, borrows its heat from the blood of its parent, it lives in a warm bath of 100° Fahr., but directly it comes in contact with the colder air the lungs are expanded, and a new function commences, that of supplying the balance of heat which is necessary to antagonize the refrigerating influence of the atmosphere; this task, as is well known, is accomplished in respiration by the absorption of oxygen, the exhalation of carbonic acid and the oxidation of the carbonaceous elements of the blood. The constant, never ceasing task of the breathing animal is, then, the generation of heat,

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but this function cannot, under all circumstances, be sustained without the aid of art. The aboriginal man, whatever may have been his social condition, could not have maintained his existence without procuring shelter against the chilling radiation of the atmosphere, the pungency of the solar rays, or the sudden precipitation of aerial moisture.

In the primitive devices resorted to in such emergencies, is shadowed forth the first duty of the architect as the helper of nature, the primary essential work of producing a covering which shall be durable, opaque to heat, water-proof, and shall insure the prevalence of such a range of temperature and degree of dryness, in the abode of man, as may be consistent with the easy maintenance of the vital functions. In the fulfilment of this first purpose, he is limited in his efforts by certain indispensable conditions. Taking into account these several desiderata, I propose to arrange all the observations I have to make under six heads, some of which I shall very lightly dwell upon: 1. The nature of architectural covering. 2. The admission of air for respiration, and as an agent for the extrusion of gaseous impurities. 3. The admission of light. 4. The auxiliary use of clothing. 5. The uses of artificial heat. 6. The removal of liquid and solid exuviae.

I here omit what I had intended to say on the modified nature of the architect's duty in hot climates, merely remarking that the same leading principle prevails, that of interposing a screen which shall intercept the passage of heat too rapidly, either from or towards the surface of the human frame, but in a manner consistent with the provisions which I have just pointed out.

Omitting any review of the exigencies which the architect may have to meet in his cosmopolitan character, I turn to that part of my subject, which I have most at heart, the sanitary state of our dwelling-houses in the great towns of this kingdom.

Ever since the severe animadversions of Erasmus, delivered three centuries ago, our habitations in England have maintained a bad reputation; but more especially the abodes of the poor, are notoriously deficient in the qualities becoming the home of a decent family. I shall now proceed to consider these deficiencies seriatim, under the several heads already indicated.

1st. With regard to architectural covering, it is well known that nine-tenths of our London houses are neither water-proof, nor sufficiently opaque to heat, to protect the inmates against the vicissitudes of heat and cold; porous unvitified brick walls, of nine inch or less thickness, with thin slate roofs, are the best means used to keep the inhabitants dry and warm in winter, and dry and cool in summer. That this shortcoming is not due to want of constructive skill, but to the diversion of capital in other directions is evident, if we attend to the comparatively well built houses of the opulent and comfortable classes; but especially to the admirably designed and well finished store houses and other structures devoted to meet the exigencies of commerce. Those commanding piles, as seen in that handsome thoroughfare, Cannon Street, in some degree, redeem the character of London for street architecture.

I have here a table, formed by selections from the Registrar-General's returns, and which shows the deleterious effect upon life of the ill-built egg-shell habitations of the poor. The duration of life among the comfortable classes, is here contrasted with that of the mass of the other inhabitants in each of the parishes named. The average age at death, of the inmates of the better houses, reaches forty-five years, whilst that of the mass is only thirty-six, being a difference of nine years in the mean age of the two classes; a difference due, in a great degree, but not entirely, to the defects of the habitations.

In erecting a dwelling-house, I imagine, an architect should regard himself as founding a domestic fortress to endure for centuries, and to be an asylum suited for the accommodation of a family, or of a knot of families, under all the circumstances of life, for the contingencies of sickness or health, leisure or occupation, the rearing of children and the repose of old age. In the majority of cases, it should be perfected at such a cost that shelter within it should be within the means of the journeyman and petty-chapman class.

In old communities society cannot afford to supply a thoroughly good separate edifice for every family, and in the most ancient societies of Europe we find the practice adopted of agglomerating the homes of many families into the shape of a large conventual mansion under one roof.

An edifice thus imagined, should, of course, consist of strong and durable non-conducting materials, adapted to resist the action of chymical and physical forces, and equal to prevent the passage of heat in either direction. In these islands, the architect commands an abundance of means to effect his purpose. He can insure uniformity of temperature in the wine cellar and the ice-house; and in the formation of kilns he enables the manufacturer to collect and imprison an intense accumulation of calorific power, by surrounding the fire with walls of sufficient density. Why should not the same means assure, to the dwelling places of the people, the range of temperature prescribed for health and comfort?

The brick-bat is, probably, as a non-conductor, not inferior to stone, and in resistance to the chymical action of the air it is superior. Looking chiefly to London, it is the building material most eligible for the construction of a durable house. The brick I mean, however, is not the sham put into London walls, but such a cube as I have seen in Roman ruins, which have resisted time and tempest for two thousand years. Bricks, consisting of good terra-cotta ingredients, baked in close kilns, and glazed by the same vitrifying process as stone ware, might be a more costly material at first, but would be the cheapest in the long run, especially when the architect honestly intends his work to last. With such a tough opaque material I would build the outer walls of my house, at least two feet in thickness; and for moral and sanitary reasons, also all the interior partitions of the same substance. As the roof is always the weakest, as it is the ugliest part of every building, and also offers the least resistance to heat and cold, I would substitute for it the flat oriental terrace, called the Belvedere in Italy, and the Azotea in Spain, and, probably, introduced by the Saracens into the south of Europe.

Where economy of space is an object, the house should be square, and the flat terrace would also save us the loss of room which occurs in the angular gabled lofts; the symmetry of the topmost apartments would then equal that of the lowest. Contemplating the erection of an edifice suited for the accommodation of several families, and in which durability, salubrity and economy are to be insured, I would exclude, as far as possible, all building substances except brick, stone, and iron protected against oxidation by being electro-plated with copper. I would have no porous surfaces, no lath and plaster, no wooden floors, and for the doors and windows I would use wood, hardened in Kyan's patent Solution of Perchloride of Mercury. The ceilings, floors and walls, consisting of enamelled bricks and tiles, luted together with hard crystallised cement or mortar, and girdled with electro-plated iron, should present a continuously glazed or metallic surface, affording no cellular *nidus* for infectious malaria, and capable of being washed with water without creating humidity.

For securing perfect privacy, and in case of the occurrence of contagious maladies (such as small-pox, typhus, scarlet fever, &c.), for obtaining an effective quarantine, the construction of dense brick and mortar partitions, of the same excellence as the external walls, becomes indispensable.

2nd. The shell of a dwelling formed with such an architectural covering as is capable of resisting excessive radiation outwards, or the undue transmission of heat inwards, being once completed, it is still necessary, to the support of life in the occupiers, that inlets for air should be reserved. As I have already stated, the great source of heat is respiration, a function through which the carbon of the food is consumed by its combustion with oxygen. An abundant influx of air is necessary to supply this element of fuel. Dr. Meryon, in a recent publication, asserts that twenty cubic inches of air are inhaled at each inspiration—400 cubic inches per minute, during which period 150 oz. of blood are propelled through the lungs. Three hundred and sixty-six cubic feet of air, or 36 hogsheads, and 13,488 lbs. of blood permeate the lungs in 24 hours. By this process the demand of the human system for the

generation of heat is answered. Lavoisier, Laplace, Sir H. Davy, and other philosophers, have made experiments to ascertain the quantity of heat disengaged from certain animals in a given time, and have satisfied themselves, by measurement, that the oxidation of carbon and hydrogen, as manifested in the products of respiration, when properly protected by opaque inclosure, is sufficient to supply the waste of heat lost by radiation from the surface of the animal. This generation of heat, however, is attended with another effect, the contamination of the air, by the evolution of gaseous excrements, which, unless speedily removed, create a stagnant malaria round the body. Each adult spoils, by the action of the skin and lungs, 280 cubic inches of air per minute. Allowing a wide margin for accidental variations, we may state the amount at 360 cubic inches. The gaseous vapours given out from the skin and lungs consist principally of carbonic acid and watery vapour. M. Valentin found that the whole quantity lost by exhalation from the cutaneous and pulmonary surfaces of a healthy man, who consumed daily 40,000 grains of food and drink, to be 19,000 grains, or $3\frac{1}{2}$ lbs. Subtracting from this the pulmonary exhalation of 5,000 grains of carbonic acid exhaled over that of the equal volume of oxygen inspired, weighing 2,256 grains, the remaining 11,744 grains, or $2\frac{1}{2}$ lbs., represent an average of cutaneous exhalation in the day; all which must be swept away by ventilation. The balance of 21,000 grains are disposed of in the shape of the liquid and solid excrement. Liebig calculates the quantity of carbon alone eliminated from the lungs and skin, in the twenty-four hours, at not less than 13.9 oz. These gaseous vapors, if not displaced, are inhaled again; every inhalation of used air absorbs less and less carbonic acid from the system, and this excrement consequently remains in the blood, acting as a narcotic poison; the brain of the sleeper is stupified by the circulating carbon; in the morning, he feels languid, heavy and unrefreshed, and his breath is offensive. Such are the effects exhibited in most dormitories, of which the air is at the same time most repugnant to the sense of smell. The person is surrounded with a halo of impure vapour, which requires a steady stream of air to dispel it.

This is the true theory of ventilation; sufficient pure air must be afforded, not only to support respiration, but to supply such a stream as shall carry away all the excretions from the lungs and skin. But this service is to be performed in a manner consistent with the first purpose of the architect, namely, the preservation of the normal animal heat of 100° Fahr.; and the method must therefore vary according to the temperature of the air. The colder the weather, the less is the exhalation from the skin and lungs, and the less the excrementitious vapour to be swept away. Consequently the less rapid, and the less refrigerating, is the purifying current of air required. In hot weather, and in cases of fever, where it is often necessary to cool the surface of the body, by promoting evaporation and then condensing and dispelling it, the waves of the atmosphere must be made to pass more rapidly over the surface of the animal. Thus is defined the task of the architect: he must procure for us air in such quantities, and moving in currents of such velocity, as may be exactly adapted to sustain the normal warmth, whatever may be the temperature of the hour.

It has been calculated that the human being requires to be enveloped, as in a cloud, by an area of 1,600 cubic feet of respirable fluid, as a kind of menstruum in which the gaseous excrements are to be dissolved; but as this medium is in a state of constant passage through the apartments, probably, much less space would suffice for purity of respiration.

To maintain this continual change, I have reckoned that a volume of 3,600 cubic inches, or about two cubic feet per minute, would be enough to feed such a ventilating stream as is needed for one person. Dr. Arnott supplied the Marine Artillery Barracks, at Woolwich, by means of a steam pump, with air, at the rate of four cubic feet a minute for each man; and Dr. Boswell Reid propelled into the House of Commons not less than seven cubic feet per minute for every Member of Parliament.

To supply such ample volumes of air is perfectly impracticable in houses of ordinary mould, except

by admitting cold blasts through open windows, a proceeding, in the winter months, quite inconsistent with the architect's main purpose—the conservation, at a healthy standard, of the actual warmth of the apartment. According to the best medical opinions, this standard should be 60° for children's nurseries and sick chambers, and from 50° to 55° in rooms where persons are employed in sedentary occupations. Below this temperature, disease in the very young, and in the very old, is likely to be engendered.

The supply of air, that most essential pabulum of life, has scarcely won due attention from architects: it is only permitted to enter houses clandestinely, and it comes in in jets and draughts. I have thought that such an important purpose, as the supply of this food of the breath, is deserving of an especial provision, and have, therefore, taken the liberty to suggest, that between each storey of every house, a space should be reserved for the exclusive reception of air, and which should freely communicate with the external atmosphere. Between this intersolar reservoir (measuring twelve inches in depth) and each subjacent apartment, a ceiling should interpose, in which a quadrangular opening two feet wide, and reaching from end to end, should be left; and a diaphragm, or sliding hatch, moving on rollers like a sash-frame of a greenhouse, should be fitted to close this on occasion. This sliding partition should consist of three panels, each two feet wide, and which should equal in measure the long diameter of the underlying room. One panel should be imperforated, the second drilled with very small holes, and the third with apertures of a shade larger diameter. As this hatch is to move laterally on rollers, to such an extent, as to allow the quadrangular fissure to be entirely open on occasion, it will be in the power of the inmate below, by means of pulleys, to regulate the ventilation with the nicest regard to his feelings. He might shut out the air altogether, or graduate the quantity admitted to any degree, by sliding the hatch gradually over the air-way, or *atmode* proposed. A drawing in the lithographed sheet appended to this paper, displays the whole arrangement clearly. By this means, the impulse of the approaching air may be increased from a gentle wave-like motion to a brisk breeze, according to the desideratum of the moment; and the used air, ascending into the reservoir by the force of gravitation, would be carried off by the currents there prevailing.

In nurseries, infirmaries, &c., it is desirable that ventilation should be controlled and nicely measured, and I believe the power of producing this result is obtained by the conjoint use of the mode of admitting air which I have named the *atmode*, and of the horizontal smoke-sewer or *vomitorium*.

The means of accurate measurement is obtained by utilizing the evaporating property of air-currents. Evaporation and refrigeration are correlative, and the one is in fact an exact measurer of the other. Thus in Mr. Glaisher's arrangement of the wet-and-dry-bulb-thermometer, the temperature indicates the quantity of moisture in the air; the lower the temperature of the wet bulb the less is the moisture; but the velocity of the air current increases evaporation, and augmented evaporation lowers temperature.

By distinguishing the fall of temperature due to evaporation in the ordinary calm condition of the atmosphere, from the further effect due to air currents, we obtain a fine scale for noting degrees of air velocity. I take one of Glaisher's double thermometers, and protect it in a glass cylinder from the action of draughts, and I find the difference between the wet and dry bulb to indicate the humidity or dryness of the quiet air. By its side I place another double thermometer, and on the second wet bulb I find marked the further effect of evaporation produced by the moving air. The difference between the two wet bulbs exactly indicates the force of the draught. The difference between the temperature of the dry bulb, and the dew point, being divided into a scale of 100° the exact expression, for the force of calm evaporation, of the augmented evaporation due to air currents, and of the difference between the two, may be in a moment ascertained by a reference to Mr. Glaisher's tables, or by an easy calculation. (See lithograph drawing in the appendix).

The force of air current devoted to the expulsion of impure gases should be considerable, for such fluids have a kind of attraction to clothing and all porous surfaces, such as tapestry, lath and plaster walls, flock papers, and coarse deal boards. In these sinuosities, animal effluvia are decomposed, and produce and foster the *seminium* of fever, which under certain atmospheric accidents may become epidemic, and spread from the hut to the palace.

3rd. In England, the architect depends for his supply of air chiefly upon his windows; and, doubtless, there are times in the summer months when these defensive glass screens may be left open without detriment. In dormitories, in the absence of a better contrivance, it is found more prudent to resort to this simple expedient for purifying the apartments, than to inhale the offensive malaria with which they are filled.

Glass is so rapidly diathermal a substance that, in cold weather, the radiation from closed windows is so copious, that the temperature of apartments is often quickly lowered, and chilly currents of air are driven inwards from the surface of the glass. These avenues for light are also often too large for the room, and render it impossible to keep up an equable temperature. I have known many cases of fatal inflammation produced in persons sitting incautiously near closed windows, and continual relapses are induced in valetudinarians by the same imprudent act. The price of glass is now so much reduced that double-sashed windows could be supplied in the generality of houses; but where this protection cannot be obtained, the construction of windows of a size proportionate to that of the apartment, and the adoption of the invention which I have ventured to recommend, would diminish the force of the draughts thus created. Large windows and a bright light form a great luxury, and are, in some respects, salubrious, but heat is the want of every moment.

4th. In his efforts to aid nature in her struggle to uphold the normal heat of the blood, the architect has a right to expect that the inhabitants of houses should second him by protecting themselves, whilst indoors, with clothing suitable to the season. This is a care which, in England, is universally neglected; a kind of semi-nudity is practised in the house, especially by women, who often provoke the attacks of serious maladies by exposure to sudden chills in passages, halls and staircases. In the South of Europe, where often no fires are kindled in sitting rooms, the people are wiser, and invest themselves in as warm raiment indoors as in the open air. They, therefore, circulate with perfect impunity all over their houses.

To a person properly clad, a temperature of 50° would afford a genial sensation. This is a degree of warmth which is shewn, by this table, to be maintainable without difficulty where good architectural covering is aided by artificial temperature. These tables, shewing the influence of architectural covering in preserving and controlling temperature, and also the additional effect of fire, I have computed from observations, most carefully noted and recorded, for more than twenty years, at Chelsea, by the late Mr. Charles Soare, a retired Commissariat Officer, assisted by Mr. Bacon, a schoolmaster in the same neighbourhood. The neatness and accuracy displayed in these records furnish a pattern for all meteorologists, and would satisfy the exigencies even of Mr. Glaisher.

The comparative notations of indoor and outdoor temperature were made in a small house, situated in the King's Road, Chelsea, an average sixth class residence, displaying all the usual defects observable in such erections, yet the actual amount of retained heat was considerable, and the daily, monthly and yearly range of the thermometer was (as is seen) greatly lessened. From the facts demonstrated here, we may conclude, with certainty, that a house constructed on scientific principles, would insure the maintenance of a wholesome degree of warmth without much aid from artificial heat.

5th. One of the first physical conquests of the refugees from Eden must have been the invention of fire, which was soon discovered and applied by Abel in his sacrifices. Man is a cooking animal, and his digestive organs are not capable of assimilating many of the crude aliments presented by nature. The

sudden and capricious changes of the atmosphere, too, arising from the effect of heat and cold upon aqueous vapour, and generating the fluctuating aerial currents, called winds, must have soon suggested the expediency of adopting artificial heat, in addition to architectural covering, as a means of aiding the respiratory organs in their work, and in sustaining a wholesome range of temperature in the dwelling house. This is a subject which has much occupied the attention of architects and engineers, and an extraordinary amount of ingenuity has been displayed in the various suggestions promulgated, with a view to make combustion perfect; to distribute its radiation widely, and to carry off the chymical products of ignition. There are many gentlemen present more skilled in the treatment of these matters than I am, I shall therefore confine my attention to a few points with which I am familiar. Notwithstanding all that has been said in favour of warming inclosed spaces, with hot water, steam pipes, air flues, close stoves, &c., the open fire is still the favorite method in the popular mind. We continue to consume our fossil-fuel coal with an enormous waste of caloric and combustible matter. Large lumps, or ingots of coal, are placed in contact and subjected to ignition, the surfaces, which are immediately exposed to the active fire, are decomposed and consumed, but the adjacent strata are heated at the same time, in different degrees; some to a degree not adequate to sustain combustion, but quite sufficient to expel the carboniferous gas which escapes up the chimney unconsumed. It has been calculated that by these losses, and the heat carried away in the smoke, a waste of 80 per cent. is experienced.

To mitigate this great loss, and to obviate other inconveniences, Dr. Arnott has endeavoured, with some success, to impart to the fire-grate some of the properties of the gas-retort, and to retain for use the carburetted hydrogen gas, and the solid particles of fuel, which are otherwise lost in the current of the smoke. With the same object I contrived my "solid gas fire," named "the *Atmopyre*," which I was permitted to exhibit to this Society sixteen years ago. On that occasion, I had the pleasure of showing an artificial cinder made incandescent by the combustion of hydrogen in air; a fact, indicating, as I then thought, and as I still think, the possibility of applying the hydro-oxygen fire to common use. The difficulty of economically separating hydrogen from oxygen in the decomposition of water postpones that triumph of art to the future; and our immediate care must be directed to the better management of our most comfortable, but very unscientific coal-fire.

If Dr. Arnott's excellent idea of consuming smoke could be realized, there would still remain the need of carrying upwards the products of combustion, and the impediments which I experienced in applying my *Atmopyre* are still unsubdued in all chimneys of the usual character. In consequence of these impediments, my attention was early turned to the means of ventilating ordinary chimneys, in such a way, as to command the occurrence of a constant upward draught.

The ascent of the gases generated by combustion may be impeded by two different causes. First, in a still and humid state of the atmosphere, chimneys are filled with a body of air very nearly saturated with vapour, and, consequently, so conditioned as to resist the first feeble pressure of the rising smoke and its cognate gases. This hindrance can only exist during a perfect calm, and the first wave of air crossing the chimney-top dispels it. The most frequent and pertinacious obstacle to the easy escape of smoke, consists, secondly, in the disturbing effects of air-currents upon the chimney finials, which are generally terra cotta pots, or contorted zinc tubes. It is a law in pneumatics, the necessary consequence of the universal force of gravitation, that wide and strong currents of air over-rule and attract to themselves all minor breezes. The impulse of wind is simply its local weight, but a degree of rarefaction is produced on the edge of every current, which causes an influx of the adjacent quiet air, and exerts beneficially an exhaustient effect upon the draught of flues. Such a strong gust of wind approaching an ordinary stack of chimneys, of course, displaces, by its weight, the lighter atmosphere round about,

and, descending into the flue, drives down the ascending smoke. When undisturbed by such moving columns of air, the tranquil atmosphere permits the ascent of smoke, or rarer air, which obeys the law of gravitation as implicitly as floating bodies on the surface of water. It is by the lateral pressure of the colder air that the heated products of combustion shoot upwards into the sky. The proper function of the chimney is to convey the air and gases, rendered light by the heat of combustion, from the grate, where they are coerced by the atmospheric weight in the apartment, to the top of the flue, where they are immediately subjected to the lateral stress of the outer atmosphere, and either drawn away by the attraction of passing currents, or propelled upwards to the normal height suited to their levity. To the perfection of this effect, two circumstances are required, first, that the air of the warmed room shall be equal in barometric pressure to the air above: and, secondly, *that a body of air, protected from disturbing currents, shall always surround the upper aperture of the flue.* The first effect is secured by the adoption of the *atmode*, or air channel, already described; and the second result, I believe, may be always insured by another arrangement which I have invented.

I have found that, in my experiments with the atmopyre, wherever the orifice of my escape-pipe for the products of combustion entered, (a passage of some length and open at both ends), the currency of these gases remained perfect, and that in these passages there prevailed, invariably, a flow of air in one direction or the other. These facts suggested to me the idea of my *vomitorium*, or smoke *exode*, the principle of which, I think, is established by my experiments on lamps. In order that the column of smoke should disembody itself freely from its channel of escape,—the chimney, it is necessary to prevent the rude contact of the wind with the immediate vent of the flue, and this object is achieved by the inclosure of the chimney vents in an oblong chamber, or ample tunnel, of which the calibre must rather exceed twice the sum of that of all the flues. The mouth of each flue should project, in the shape of a collar, into this receptacle, which would extend from one parapet to the other, and each end would be on opposite aspects of the house. Each mouth of the tunnel may be closed by a perforated door; and on either side, on a level below the collars of the flue, there should open several holes of a dimension proportionate to the number and size of the flues.

A careful observation shows that the phenomena exhibited in my apparatus, as well as by the experiments made on two small houses in Chelsea, occurs as follows, and are well displayed in the lithographed illustration. The chamber of the vomitorium is filled with air of the temperature and density of the atmosphere, and proceeding from the lateral holes, or from the foramina, at either end. This air is either in a state of gentle motion along the tunnel, or moves in a more rapid current from end to end, in which last case it exerts an exhaustient, or suctional force, upon the flues, and, consequently, vivifies combustion in the grates below. This is a power which can be utilised, in vigorously ventilating the abodes of the poor, in spite of their perverse hostility to the admission of air. The fires being kindled, the jets of smoke issuing from each flue rise to the arcaded roof, sustained by the cushion of cold air, already existing, and which is constantly fed from the sources described. Finally, the smoke escapes outwards along the roof of the vomitorium, and the superior apertures at the obturated ends; making its exit, sometimes at both ends, when the atmosphere is tranquil, sometimes at one or the other end, when the commanding current is active. This succession of effects seem due to the maintenance of an equilibrium between the air within, and the air without the house, and in theory, is as simple in principle as the adjustment of weights in the scales of a balance.

6th. I have shown what an important agent, in the production of animal heat, *oxygen* is, but its absorption into the blood would be absolutely sterile, unless it were chymically married in the latent recesses of the living frame with its consort, *carbon*, which can only emanate from the digestion of certain viands

by the stomach, and their nutritious principles being conveyed into the blood. It is the *charcoal burning* which occurs in the course of the circulation that generates the vital heat. The importance to health of a proper preparation of food is therefore patent. A deficiency of skill in the art of cookery is everywhere observable amongst the wives of our working men. Hence arise immense waste, discomfort and domestic contentions; and it is a consideration, I think, which may be urged on the architect and economist, whether, as experience proves, the erection of a house for an aggregate of families is more advantageous than the construction of a separate small dwelling for each family; the same principle does not indicate the establishment of general kitchens, where wholesomely cooked food may be purchased by all. I believe such undertakings would prove excellent speculations, would be a convenience to many middle class families, and, most certainly, greatly promote the cleanliness and comfort of poor householders.

7th. The invention of means for carrying off the solid and liquid excrements of the animal frame is, of course, a want not less urgent than the extrusion (by sharp currents of air) of the gaseous exhalations. The first differ from the last only in the fact that hollow viscera are provided for their temporary retention in the body; they are all alike, in a continual state of elimination from the blood. When once ejected from the body, and exposed to the action of the air, heat and moisture, they rapidly decompose, and generate vapours equally tending to provoke the outbreak of disease. As all these *exuvie* are convertible into food for plants, it is certain that, as soon as chymists shall have invented a formula for this conversion, the value of the products will awaken the capitalist into efforts for their utilisation; and the opprobrium will no longer rest upon this metropolis, of throwing away "native guano," equal in worth to three millions sterling annually.

There is nothing, perhaps, in the habitations of the poor people, more urgently calling for reform than those retreats where the human being is called upon to perform his most humiliating function, an act in which he is placed on a level with the most humble of his mammalian fellow creatures, and with which nature has associated a feeling of shame. In the performance of these physiological acts, it is desirable that the individual should be protected from gross familiarity by decent seclusion, and that self respect be sustained, by the supply of means for personal cleanliness and purity. The wretched boxes which are placed in our small houses for the gratification of these wants, are deficient in all the postulates for modest decency and health, they are in fact, prolific sources of diseases. These cabinets ought to be capacious, well supplied with water, ventilated, sufficiently secluded; and each dwelling should possess a number proportionate to the number of inmates.

8th. As the builder of cities, and as the cause of accumulated edifices, and a concentrated population, the architect is responsible not only for the hygiene of particular dwellings, but also for the general salubrity. It is for him to supply remedies for the evils which his own acts produce. We look to the ingenuity of this artist for the preservation of wide streets, and open spaces for air and exercise, for copious supplies of water, for perfect facility of drainage, and for every aid that can be required for the health and cleanliness of the population.

From the enlightened influence of the architect we may hope for the abatement of that greatest evil of towns—the ground rent. The accidental proprietor of land in the neighbourhood of a growing town becomes, without the slightest personal merit, a magnate of wealth; by competition his land commands a fabulous price, which in future years imposes an absolute veto upon all improvement. Now the improved value of this person's land is entirely the work of society, and society has an undoubted right to measure out its benefits to this its member. The law of supply and demand is good, but there are social considerations which are paramount to it.

In such an unprecedented hive of human beings as London presents, every facility for cleanliness in person, clothes and habitation, should be supplied, not only in dwellings, but by such general establishments as baths and wash-houses, the erection of which is clearly within the municipal obligation of parishes. The accumulation of household dirt, and personal filth, is the result of the close agglomeration of the population in small spaces; it is produced by society, and society is bound to provide an adequate remedy.

The sketch of a house, which an artistic friend, eminent in another branch of pictorial art, has condescended to make for me, and which is shown in the appendix, is intended to show the appearance which a habitation, constructed in the way I suggest, would present. The *vomitorium* and the *atmode* are both represented, and shown not to be eyesores. A staircase of stone is supposed to ascend from the basement to the terrace, and to be the general approach to all the apartments. It has been objected to the idea of the "common" staircase, so universally prevalent on the continent, that it is repulsive to the habits of our people. The vanity of this objection is immediately shown, by the fact, that thousands upon thousands of persons, in London, do actually live in lodging houses, and use a common staircase, much narrower and more inconvenient than the one here proposed; and that these persons are of various ranks and means, a fact which brings the working people into proximity with the more opulent inhabitants, and places them within the compass of kindly counsel and sympathy.

It has been said, and perhaps truly, that the single sentiment of charity, notwithstanding the example of Mr. Peabody, is not powerful enough to produce such an outlay of capital, as the erection of solid and durable houses of this class implies. The wretched system of building dwellings upon leasehold security, instead of freehold, is the cause that the architecture of these edifices is so unsatisfactory, most of these houses being built merely with a view to sale, and a quick return of the capital with interest. It is rarely that a man erects a house for himself on his own ground; and no man ever thinks of building houses upon a large scale as a patrimony for his family, as many noblemen in France, Spain and Italy do. Speculating builders, even at the Court end of London, erect showy rows of mansions, decorated with the ordinary architectural millinery, but deficient in scientific construction, and intended only to last a limited time. Great expense will never be incurred in the production of ephemeral structures, but when ample revenues are to be created for centuries, in the form of estates in houses, then large investments of capital would be devoted to the construction of mansions, and the best materials, with the most skillful workmanship only, would be employed. If we look at the old cities on the Rhine, and in Belgium, and at many large Continental towns, we shall see that such investments are both safe and profitable.

Our vicious system of building, in England, is so rooted in the habits of small capitalists, that it will, probably, require an act of the legislature to restrain it. And this interference will not be long delayed, when public opinion becomes conscious that policy, as well as philanthropy, suggests that it is desirable the homes of the poor should be improved. That society is not safe, where the majority of its members do not very obviously see what benefit accrues to them from its action. There are signs which indicate that contentment is not the master sentiment in the minds of our industrial classes. Handsome churches are erected, and gorgeous rituals are invented to attract them, but they still hold back. Museums and literary societies are formed for their edification, but these compete too feebly with the fascination of the gin palace; and the poor man has no pleasant sentiment associated with the word *home*, because, to him, it is cramped, dirty and unhealthy.

Is it quite visionary to hope, that all the forces of this great English society, actuated by all the motives which press themselves upon our attention, are strong enough to accomplish such a reform in our domestic architecture, as that the hearth and home of the poor man may become the abode of peace,

health and contentment, the nursery of piety and the pure affections? I believe it is not. Perhaps we have all all been too solicitous to garnish, each his own little cell of self-interest, and careless of the security of that great social dome that should cover us all? Happily this supineness is now dispelled and the public heart is pregnant with great designs. It is felt that too great a repulsiveness has been allowed to grow between the several ranks of our people. They have been too much segregated, and the several ranks do not know each other, or appreciate their mutual virtues. In all coteries, there prevails a desire for reconciliation; and from my long intimacy with the character of our working men, with their good sense and right feeling, I feel sure that all efforts undertaken, with earnestness and in a proper spirit, will satisfy their judgment, and call forth their gratitude and affection.

I.—TABLE, showing the comparative Length of Life, of the well-housed inhabitants of certain districts; and of the mass of inhabitants in the same districts, including paupers.

Description of House.	NAMES OF DISTRICTS.												
	St. James's.	St. Giles's.	St. George, Hanover Sq.	St. George, Southwark.	Marylebone.	Whitechapel.	Greenwich.	Poplar.	Strand.	Bethnal Green.	Kensington and Chelsea.	Islington.	Rotherhithe.
	MEAN AGE AT DEATH.												
	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.
Comfortable dwellings.....	42	42	45	43	46	47	48	43	43	46	45	42	49
Other houses	37	34	39	27	30	32	45	35	33	33	32	35	39
Difference.....	5	8	6	16	16	15	3	8	10	13	13	9	10

Average life of the opulent..... 45

Ditto of the lower class 36

2.—Comparison of in-door and out-door temperature, and relative humidity during the three hottest and the three coldest months, in Chelsea, compiled from the observations of Mr. C. Soare and Mr. Bacon, made during 20 years, from 1827 to 1846, showing the effects of architectural covering.

Months and Seasons.	Mean Temp. out of doors.	Mean Temp. in-doors.	Wet bulb Thermo.	Dew point.	Diff. between in-door and out-door Temp.	Relative humid. in-doors.	Relative humid. out of doors.	
January	37.02	43.73	34.14	30.02	6.71	68.72	81.00	
February	39.39	46.44	35.39	30.30	7.05	65.40	77.00	
December	40.39	46.64	35.80	27.60	6.25	74.89	85.09	
Average	38.93	45.60				69.67	81.03	{ Average humidity for three months out of doors Ditto in-doors Gain in dryness
		38.93					69.67	
Mean difference		6.67					11.36	
June	59.99	65.11	47.99	37.40		57.70	62.30	
July	63.48	68.18	51.95	42.20	4.70	61.90	60.90	
August	61.27	66.97	51.27	42.60	63.58	63.58	69.50	
Average	61.58	66.75			5.70	61.06	64.23	Average humidity out of doors Ditto in-doors Gain in dryness
		61.58					61.06	
Mean difference		5.19					3.17	

3.—TABLE, showing the difference between natural temperature, and the temperature maintained by architectural covering and artificial heat. The observations were made at Torquay, 1826-27.

State of Thermometer.	Nov.	Dec.	Jan.	Feb.	March.	April.	The facts are supplied by Sir J. Clarke, F.R.S.
Mean natural temperature of the month	49.90	48.36	45.91	45.48	48.20	52.82	
Ditto in-doors	63.90	64.52	63.56	62.60	63.16	67.64	Mean temperature raised
Gain in absolute heat	14.00	16.14	17.65	17.12	14.96	14.82	
Natural monthly range	29.00	18.00	25.00	29.00	23.00	26.00	
Range in-doors	7.00	6.00	6.00	11.00	9.00	6.00	Diminution in monthly range
Degree regained in steadiness	22.00	12.00	19.00	18.00	14.50	20.00	
Mean natural daily range	5.00	5.00	5.00	6.00	8.00	11.00	
Ditto in-doors	1.00	2.00	1.00	3.00	3.00	2.00	Gain in steadiness
Diminution of the mean daily range	4.00	3.00	4.00	3.00	5.00	9.00	
Natural extreme daily range	10.00	12.00	13.00	16.00	23.00	12.00	
Ditto in-doors	4.00	4.00	4.00	7.00	9.00	5.00	
Diminution in extreme daily range	6.00	8.00	9.00	9.00	14.00	7.00	

coming from beneath the floor would hardly be prevented, and would not be found pleasant; the object generally was to admit the air into a room above the level of the head. He believed if the air was admitted at a higher level it practically ventilated more than from below, though theoretically it was not so. Another point of ventilation was, the size of the aperture for admitting the air was of the same size as that for the exit of the vitiated air: he had found it fail in a large workshop. The reduction of the aperture for the entrance of the air to one half, in that case, occasioned it to work perfectly. On the subject of windows, no doubt there were many evils connected with them, one, however, could be provided, in a great measure, by the introduction of a thicker quality of glass, which would present greater resistance to atmospheric influences, and also be less liable to fracture. Everyone must have found a room much warmer with plate glass in the windows, and the great reduction in the cost of glass enabled thick, if not plate glass, to be used for the commonest purposes. The question of chimneys is a very important one, and he believed the plan proposed in the paper was the most perfect of all if the flues were in use; but suppose there were two flues with fires, and the other two were without fires, and suppose there happened to be a room which wanted a supply of air, the opening into a well staircase, the staircase acted as a long arm of a syphon, and would very soon fill the room with smoke from the down draught, particularly as the staircase would, probably, supply the air for the rooms with fires. The great object should be to heat the passages instead of heating the rooms. If they heated the passages sufficiently, and the warmth entered the rooms, they occasioned not only more ventilation but made a more healthy house than when the rooms were heated by separate fireplaces. Another object was to bring pure heated air into the room. On the general question of obtaining this warmed air, if they could accomplish it by double flues, that would be the best thing; practically, this had not been done because it was too expensive, but in theory it was perfect, and no doubt it would eventually be accomplished, and they could, at all events, be employed in the higher class of houses. He begged personally to express his thanks to Dr. Edwards for bringing this subject before them.

Mr. W. WHITE, Fellow, in seconding the vote of thanks, remarked that, although much of the details could not be called architectural, yet there were several subjects treated of in the paper sufficiently associated with architecture to make them of use and interest to this Institute, especially those points commented upon by Mr. Jennings. It was scarcely clear whether this draught was to come in through the ceiling, or through the floor, as Mr. Jennings supposed. [Dr. Edwards replied, it came down from the ceiling.] That made all the difference; and it was simply following out an old device in the shape of a square tube carried through a room beneath the ceiling, perforated in the sides, which had the same effect as the mode proposed, and as he (Mr. White) thought with much simpler construction. As regarded the draught of the chimneys, if it so happened that these [referring to diagram] three fires were alight, and the other one (away from the wind) was not lighted, it appeared to him that this room would require a supply of air, which it would still, probably, receive from the chimney above, and, consequently, might draw down smoke. If the other fire-place, away from the wind, was alight, the others not being lighted, it might create ventilation by displacing the air above. But he thought the same remedy for a smoky chimney, by the prevention of down draughts arising from wind, was as easily effected by a plan he had adopted, by covering each flue at the outlet, transversely, by a gable projecting over the sides of the flue, through which the wind passed. The only thing to be careful of in that, was not to have a level space on the outside of the flue for the wind to collect upon, but it ought to slope upwards towards the flue, so that if the wind came on the incline, the air would rush upwards to the ridge of the gable and pass out. There was one other question, which was rather of a sanitary than an architectural character, yet practically connected with the building of dwelling houses, that was with respect to the disposition of all offensive drainage; and it seemed to him that the plan discovered and patented by a country clergyman, in

Dorsetshire, would be, if carried out by the nation at large, a great blessing to the country: that was the substitution of earth closets for water closets. *Earth* (not sand or ashes, or anything of that description), but gypsum or clay, or common vegetable mould, sufficiently dry to pulverize, it was found, would absorb so effectually all excrementitious matter, that if dried again it might even be re-used seven or eight times without any effluvia arising from the drying, and so effectually that the presence of anything offensive in it could not be detected. Many present, no doubt, were acquainted with the discovery of Mr. Moule, but he was glad to take this opportunity of calling some attention to it.

Mr. W. A. BOULNOIS, Fellow, said, the only subject he would remark upon in the paper of Dr. Edwards, was the preference he gave to the building of freehold houses, by freeholders, over the building upon leaseholds by leaseholders. His own opinion was that, if by any accident we had fallen into this system a hundred years ago, we should have been immensely behind in our position to that we now attained in house-building in this country. It was the competition among householders to make their houses rather better than their neighbours which involved with it, as all competition did, the very best system they could adopt to meet the requirements of the age. The renewal of houses every 80 or 100 years, or their re-modelling, was an immense advantage. And when they looked at what had been done in Paris, and saw masses of buildings erected by freeholders; with small apartments and inconvenient arrangements, they must rejoice that even in such localities as Bethnal Green, or London over the Border, to select the worst instances, small houses, at about £30. a-year, had been put up, which were far preferable, as habitations for the working classes, to the fourth, fifth and sixth floors of the Paris houses. The arrangements abroad, particularly in Spain, which had been specially mentioned by Dr. Edwards, were dreadful, and no sanatory considerations seemed to influence the freeholders in building them. The only question which actuated the freeholder was to arrive at the greatest amount of lettable space. He should, for his own part, be sorry to see a change in our system in this respect. He thought, from the largest class of houses of £800. a-year, of which many were now being erected on leaseholds, down to the smallest of £20. or £15. a-year, though, doubtless, with the latter much remained to be desired, we had much better habitations than any of our continental neighbours.

Mr. H. H. BURNELL, Associate, remarked that the flooring of the houses for the poor was always the great difficulty. It occurred to him that the most suitable was, that which could be easily and thoroughly cleansed; by houses for the poor, he meant those inhabited by the lowest class of labourers, earning perhaps 18s. per week; those who, upon the receipt of the Saturday night's wages, habitually drank to excess, and whose domestic habits, under such circumstances, were filthy. How could cleanliness be maintained with a wooden floor with interstices. It was not the comfort of the thing. If he could insure the floor being well cleansed, he would certainly prefer a wooden one; and amongst the class of tidier habits they might be adopted: but the case they had to meet was that of the class who lived in confirmed habits of uncleanness.

PROFESSOR KERR asked what would be the rent of such houses as Mr. Burnell was referring to.

Mr. BURNELL replied, about 2s. per room per week.

MR. THOMAS MORRIS, Associate, thought the question of the use of hollow bricks was deserving of great consideration, inasmuch as the atmospheric air confined in the cavities was known to be the best non-conducting material that could be employed; and thinner hollow walls would, therefore, answer the purpose of solid brick walls. The old style of building wooden houses was on this cellular principle; and he had no doubt whatever that the old yeomanry of England had some of the most comfortable residences that were ever erected, in consequence of the equability of temperature due to their cellular construction. They would be cheaper, too, than brick buildings; so that when it was the object to construct economical, and at the same time comfortable dwellings for the use of the labouring classes, he believed the re-introduction of wooden houses, in suitable localities, would be of very great utility.

The vote of thanks having been unanimously accorded to Dr. EDWARDS for his paper, that gentleman rose and expressed his obligations to those who had discussed the views he had advanced. He had, he said, no interest in the subject beyond the solicitude which, as a medical man of fifty years experience in London, he naturally felt in the domiciliary condition of the poor. No one could pass through this metropolis, and look at the variety of wretched houses which the poor occupied, without feeling humiliated, especially if they knew the nature of the interiors of them. He thought, if capital were employed in the erection of large conventual houses, in blocks or terraces, of the best material and on sound principles of construction, such houses might be made to pay a good return upon the capital, and, at the same time, afford convenient dwellings for the working classes at rents within their means. He knew the houses of the poor were, for the most part, wretched and miserable abodes, the arrangements within them being totally inadequate to the common decencies of life. There was nothing like privacy, because, with two families living on the same floor, the partitions were so thin that they were penetrable by the slightest sound. He had no objection to a moveable wooden floor, over the paved one: but the objection to the wooden floors was, that they were never kept in a wholesome state of cleanliness, and a perpetual malaria issued from them. He spoke chiefly of the dwellings of the thoughtless, improvident and dissipated class of the poor, who lived but for the passing hour. The suggestion of hollow bricks, he thought, was an excellent one, and the introduction of open air spaces in the walls would, he believed, be very beneficial. With regard to letting in the air, upon the plan he suggested, it could be regulated with the greatest nicety through the *atmode*, or opening of the ceiling. The objection that had been taken, that the flues in which there was no fire burning would be subject to down draughts, he admitted, would undoubtedly obtain, were it not for the arrangement of the apertures he had provided on the side of the *vomitorium*.

Mr. JENNINGS remarked, if there was a staircase to form a funnel from the room at the same time, it would not act unless it was a syphon.

Dr. EDWARDS, having further explained his plans on the drawings by which the paper was illustrated, added, that this was an experiment of his own, and any gentlemen who would do him the favour to pay a visit to Mr. Callow, builder, of Chelsea, might see it operating, and judge practically of its efficiency. He could not think the architecture of houses was satisfactory, when he looked at the roofs of London, and surveyed the long rows of cottages and wigwams which were provided as habitations for the majority of the London millions.

Mr. BOULNOIS said, the great service which the President had rendered to the profession in his place in Parliament, induced him to ask that gentleman whether there was any probability of a change in the arrangements of the Commissioners for the erection of the New Courts of Justice with respect to the enlargement of the competition for the designs of that building: if so, it would be a great boon to the younger members of the profession, and it would be satisfactory to hear, before the Easter recess, that such an enlargement of the competition was contemplated.

The PRESIDENT, Mr. A. J. B. BERESFORD-HOPE, M.P., was happy to be able to reply, that the morning after the discussion took place in the Commons, he was informed by one of the Commissioners, that, in consequence of the opinion expressed by the House, it was intended to alter the conditions with respect to the competition for the designs for the New Law Courts. In the first place, the prohibition imposed upon the competitors not to engage in private practice for three years was to be abrogated; and, in the second place, it was intended that the number of competitors was to be largely increased.

ON SOME OF THE ECCLESIASTICAL MONUMENTS OF PARIS ERECTED
DURING THE MIDDLE AGES, AND ON THE PRINCIPLES OBSERVED IN
THEIR RESTORATION.

BY GEORGE R. BURNELL, Fellow, M.I.C.E., F.S.A., F.G.S., &c.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, April 16th, 1866.

THE municipal authorities of Paris seem to be actuated with so much of the desire of improvement that has lately "come over the spirit of their dream," and this desire takes so singularly the shape of a tendency to modernizing everything that they touch, that the traces of Mediæval Paris are gradually disappearing, and the buildings of that city are, one after another, losing their original character. It seemed to me, therefore, that some interest might be excited if the enquirer could be led to examine the traces of the past that still survive; and the ecclesiastical monuments appeared to me to be especially worthy of attention, as indicating the thoughts and feelings of the population, and as partaking more of the character of the times during which they were erected, or in which they have been modified or restored. In the following paper it will be my effort to trace the past history of the Paris churches, and to notice the changes that have successively come over the French people in all that relates to the class of motives, so far as the artistic expression that is given is concerned. It is not pretended that any order of a chronological nature is observed in the subsequent remarks; the various churches are described as they were successively visited on the occasion of a late visit to Paris; styles and ages are mixed in strange confusion; but this very want of system lends a charm of actuality to the class of observations that are called for by the occasion.

The first church that is thus brought under our notice is the church of St. Eustache, which has been lately disengaged from the strange mass of buildings that surrounded it, and has been the object of the efforts of the town to decorate and restore it. This is not, strictly speaking, a remain of the Mediæval times, for the spirit that has presided in designing the church of St. Eustache is evidently that of the Renaissance, though the proportions of the building, and the general organization of it, are decidedly Gothic, or more correctly speaking, Mediæval. Like many of the churches in Paris, also, the west front of St. Eustache is a two-storied, semi-classical screen, that harmonizes as well as it may with the internal disposition of the church; but which is a rather picturesque specimen of the taste of the first years of Louis XV. The body of the church, which was commenced in the year 1532, (it is said under the direction of Dominique de Cortone, commonly called Boccador, the architect of the original portion of the Hôtel de Ville,) is composed of a large Latin cross, formed by the intersection of the nave and choir, and the transepts; to which the aisles are added, in a double row, and the lateral chapels are introduced wherever the plan of the building would admit them; the Lady Chapel is complete, in the style of the rest of the building, and the west end is a distinct composition designed by Moreau, architect of the city, in the year 1754. The nave has five arches; the transept has two, with the length of the lateral chapel in addition; the choir has three arches, in the part before the semi-circular apsis which is constituted with five arches; the whole of this is continued up, and it forms a triforium and a clerestory, which allows the thrust of the roof to be carried down to the walls of the lateral chapels by a series of flying buttresses. It is very singular to observe the evident attempt that

which appear to have been principally of the end of the twelfth century, and in 1658 there were considerable works executed, and these last are easily distinguishable on account of the imitation of classical antiquity that then prevailed. The plan of this church is of a Latin cross, arranged in the usual style of the Paris churches, with five arches in the nave, that rise above the two side aisles, on either side, with a clerestory. This is succeeded by a transept, that is made of the width of the lateral chapels in addition; and the choir is continued with the same width as the nave, the side aisles, and the chapels, for the space of four openings, where it is terminated with a circular apsis that allows the Lady Chapel to be formed behind the altar; the apsis has six arches. The entrance is under the great tower, situated at the western end, and the doorway is a good specimen of the architecture of the period of the building the original part; the length, including the space occupied by this tower, is about 98 mètres, and the width of the church, without including the lateral chapels, is about 32 mètres. The piers and arches of the nave and choir are strongly marked by the style of the Romanesque period, but the arches of the apsis are of a later period; it is remarkable that the centre lines of the choir and of the nave do not correspond in direction, the axis of the choir inclines a little to the south. The general character of the architecture of this church may be said to be Romanesque, though some of the details are of the early pointed style; and the history of the development of French architecture can very well be studied here.

But in this case, again, the modern restorers have been at work, with all their restless desire to make everything look new and perfect. The carving of the capitals, and the other places where foliage is introduced, has been ruthlessly modernized; the painting of the walls has been handed over to the care of the same persons who have spoilt the effect of the churches by their injudicious assortment of colours; whilst the stained glass is introduced without any reference to the original design of the building, apparently for the sake of employing that material, whether it had been originally employed, or no. The works of sculpture, it is to be observed, are not executed by men who are accustomed to treat the designing of the ornaments that they are employed upon as works that may occupy their whole soul; they want the *informing spirit*, and their works are stiff and lifeless, though very correct. The paintings that are executed in the chapels are obliged to be toned down to the general effect of the church, and this is of the universal greenish grey tone now universally adopted in Paris. The decorations of St. Germain des Près, in fact, are clever imitations, they are nothing more; and they leave upon the mind of the enquirer the impression of incongruity; the more so, because he must know that the lavish waste of decoration that is thus displayed could never have formed part of the original design. The care that has been employed in designing and carrying out these works of restoration is, however, beyond all praise; and it cannot be too urgently recommended to the attention of the authorities at home.

The churches of Ste. Clothilde, of St. Sulpice, of the Pantheon, are objects of interest, but they do not come within the scope of the present lecture; and so we will pass them by, after noticing the singular *jubé* and the *cul de lampe* of St. Etienne du Mont, and the decidedly Renaissance character of that building, and proceed to notice the church of St. Severin. This is situated in a narrow street near the banks of the Seine, and it comes immediately upon the footpath, the entrance being on the west front, and under the tower which rises at the north-west angle. The style of the church is that of the commencement of the fifteenth century, which in France is characterized by great richness of tracery, but rather a thinness of ornamentation; the precise date of the building is about the year 1439. The plan consists of a nave and choir surrounded by a double aisle, and lateral chapels that occupy the whole space of the ground upon which the church stands; there are eight arches leading up to the apsis that occupies the place of the altar, and has five arches; the arches are struck from two centres, and they are continued up in the clerestory window, without, however, any triforium. The altar piece is a

great deal talked about, but it is a poor thing, composed of marble and bronze in the worst possible style of rococo architecture; the chapels and confessionals are also finished in the same style; and though the municipal authorities have taken care of the building, it has been left very much to the taste of the parishioners, who have neglected the works of restoration that are so prodigally lavished elsewhere. The consequence of this is, that the church of St. Severin has more the character of a parish church than the majority of those that we have noticed, and the original design has been less interfered with than has been generally the case. The sharpness and the perfection with which the carving of this church is preserved is very remarkable; and it certainly argues that great attention was paid to the selection of the stone in the commencement.

Beyond the church of St. Severin the observer meets with a peculiar monument that serves in its present mutilated state as the chapel for the Hôtel Dieu, under the name of St. Julien des Pauvres. This building dates from the eleventh century, and it remains almost intact at the present day. It consists of a nave and two side aisles, that are separated by a double range of four columns in front of the altar, which is placed at sufficient distance from the semi-circular apsis to allow of the placing of tribunes behind it; this has necessitated the formation of two more arches, and it may be added that the side aisles are terminated with semi-circular chapels. The height of this chapel is small, but such as it is, it has evidently given way under the thrust of the vaulting of the nave; for the thrust is counteracted by large buttresses built against the abutments on the outside. The columns that support the nave, and the clerestory windows, are good specimens of the eleventh century work; they are carefully profiled, as are all the arch, door, and window mouldings; but there is little attempt at decoration, other than that which would arise from proportion in this building. This church has by some lucky accident escaped the attention of the official restorers; and it therefore constitutes an object of the highest interest to the student of Mediæval antiquity. Dulaure mentions the occurrence of a spring that was famed for the miraculous cures it effected, which rose near the altar of this chapel; it is not at present used in any way.

Notre Dame de Paris next claims the attention of the observer. It would be a work of far too much time, at present, to endeavour to trace the history of this celebrated building, yet the interest of the subject is so great that it is hard to refrain from dwelling on it. The cathedral was built by the care of Maurice de Sully, and the works were commenced about the year 1163; but they "dragged their slow length along," so that it was about three hundred years before they were completed. It was founded upon a bed of gravel, and no piles were introduced; in the beginning, it was raised by thirteen steps out of the ground, but the whole surface of the island has been since elevated, and the access to the building is by steps leading downwards. Its length is about 130 mètres; its width, measured at the window which separates the nave from the choir, is of 48 mètres; its height, from the ground to the highest point of the arches, is 35 mètres nearly; the western front, which is the glory of French Mediæval architecture, is about 40 mètres wide, and 80 mètres high, to the top of the towers. It is impossible to describe the effect of this imposing mass, which consists of three entrances upon the ground floor, surmounted by a gallery filled with statues of the kings and celebrities of France; this again serves as a basement to the rose window of the nave, and the Gothic arches of the side aisles, and the whole of this part of the composition is crowned with a lofty gallery, of the work of the thirteenth century; these serve in their turn as the base of the square towers that terminate the composition, and they are magnificent specimens of the latter end of the thirteenth or the beginning of the fourteenth century. The entrance under the northern tower is remarkable for the representation of the zodiac, that is sculptured around the head of the door, and for the manner in which the statue of the Virgin and Child is introduced in place of the traditional figure of Ceres; the other doorways are adorned with a

profusion of statues and sculptured ornaments, which have been sadly mutilated in the course of the various revolutions that Paris has undergone. The same remark may be extended to the statues that filled the niches of the first floor gallery; and it is not surprising, therefore, to find that the architects who have been from time to time charged with the maintenance of this building should have directed their attention to the replacing of the statues. It is to be questioned whether they may not have, in many cases, substituted what is merely modern work for the antiquarian interest that always attaches itself to the original sculpture; and the long rows of statues are, in fact, devoid of all archaeological feeling; they are too *new*, too perfect, though they are very beautiful in themselves. This reproach of restoring everything to the original state is, indeed, to be addressed to the whole of the operations that have been carried on of late under the orders of M. Viollet Leduc, in spite of the skill which he has displayed, and in spite of the excellent taste with which the art sculptors have endeavoured to inspire themselves with the spirit of the original design.

However, the beauty of Notre Dame is far from being confined to the west front; it is as remarkable in the elevation of the sides of the transepts, and of the absidal ends, as in any other parts. The great rose windows that fill in the transepts are very remarkable for their original design, and the skill with which they have been restored; and the flying buttresses that are carried from the choir, the nave, and the apsis, are as singularly beautiful. There will be differences of opinion about the taste of the sacristy, the Lady Chapel, the capitular buildings, and the fontaine d'Archévêché, that have been lately built on the situation of the buildings destroyed in 1831; but there can be none whatever about the extreme grandeur and picturesqueness of effect of the whole mass of the cathedral, when viewed from the north-east, or from the south. It is imposing and grand in the extreme; detail is lost in the general effect; and the observer only begins to dwell upon the exquisite beauty of the parts when he is fatigued with the impression of the whole. The laying bare the cathedral from all surrounding buildings has, it must be confessed, added greatly to this effect, and Englishmen must blush when they compare the conduct of the Parisian municipality with that of their own country, which allows their places of public worship to be disfigured by the mean buildings of commerce. Shortly the buildings of the Hôtel Dieu, and the houses that obstruct the view of Notre Dame from the north-west, will disappear, and the whole building will stand forth in all its glory. It is ungracious, when so much is done for the preservation, and the disengagement of the building, to carp at the measures of detail; but I would suggest that M. Viollet Leduc is "righteous overmuch," in repairing the inevitable traces of time upon the ornaments of the exterior. It may be of interest to notice that M. Leduc has made an essay of Dalemagne's system of silicating the stones that are beginning to exhibit symptoms of decay; and that he has succeeded, apparently, very well in attaining his object. The atmosphere of Paris is, however, so essentially different from that of London, that no inference can be drawn from the success of that operation in the case of the sculpture of Notre Dame, for its application in London.

In the interior of the cathedral, there is given great effect by the immense height of the central opening forming the nave, the transepts, and the choir, and in the regularity with which the triforium and clerestory is carried round. The plan of this church is, as usual, composed of a central nave and choir, and a double aisle on either side, followed by lateral chapels, whose walls act to receive the flying buttresses that bring down the thrust of the central vaulting. The style of the interior is, in the greater part, of the thirteenth century, and it has been recently restored with all M. Viollet Leduc's care and attention to detail. The woodwork of the choir is, however, a modern work, of the time of Louis XIII, which M. Leduc has had the good taste to preserve, in all its contradiction to the original design, but in its expression of the religious feeling of the epoch of its execution, which, at any rate, is the sentiment to be observed in the works of restoration. There are some detached monuments, and some

pulpits and confessionals in the nave, which are of doubtful authority, but the carving of the wall of the choir may be particularly noticed. This part of the church was executed by Jean Lavi, mason of Notre Dame, assisted by his nephew, Jean Boutelier, and they were finished, it appears, in 1351; the subjects that are represented are principally taken from the New Testament History, and they are treated with the *naïveté* and the breadth of handling, that marks the sculpture of the west front. The sculpture, and the iron and bronze work, of the period of Louis XIII, is, however, very much in contradiction with the taste of this sculpture, as was said before; and there is a "geu-gaw" air about the decorations that have survived from the ceremonies of Napoléon's time, and the recent ceremonies of the marriage of Louis Napoléon, which clash singularly with our modern ideas of what ought to be the decorations of a Gothic cathedral. All this is a matter of taste; nevertheless, the principles that have guided M. Leduc in the decorations of this church seem to me liable to very considerable exception. The columns of the nave and choir are, all of them, restored with a cement that attains a considerable degree of hardness, so that they are, in a manner, restored to their original state; the paving is encausticed; the walls are painted in the style that is so common in France now-a-days, which consists in diapers, sky blue, flowers and architectural ornaments; the windows are filled in with stained glass that is marked by the prevailing greenish grey tone, and which communicates a cold, disagreeable hue to everything around. There are some pictures in the various chapels, but they are not of sufficient importance, as far as regards the mass of their colour, to counterbalance the effect of the stained glass; and I confess that, to me at least, the general impression made on my mind by the recent operations of M. Viollet Leduc, is a rather disappointing one. I would distinctly desire it to be understood that I waive the expression of an opinion upon the propriety of many details that have lately been executed for the replacing the original work, for I think that M. Leduc is so eminent an authority in this matter that he may be left to his own sense of responsibility as to when to restore, and when to replace; but I think that the general tone which is given to the restoration of the interior of Notre Dame is very unsatisfactory, and very crude. The worst of this is, that the influence and the authority of M. Leduc has prevailed in the restoration of the other churches; and traces of the same spirit may be perceived in the works that have lately been executed in St. Eustache, St. Germain l'Auxerois, St. Germain des Près, St. Martin des Champs, &c.

It is singular, with this tendency to the introduction of a greenish grey tone in the restoration of the Gothic buildings confided to his care, M. Viollet Leduc should have so completely abandoned the system in the restoration of the Ste. Chapelle, which is one of the most gorgeous works of ancient or modern times. The history of this monument, which is the next in order, and in locality, to Notre Dame, is well known; it was erected as a shrine to enclose the Crown of Thorns that St. Louis had purchased of Baldwin, Emperor of Constantinople, about the year 1239. The chapel was built under the orders of Pierre de Montreuil, between the years 1242 and 1248; it is in two stages, the under one being intended to serve as the chapel to the inhabitants of the Palais de Justice, although it is now sadly desecrated, and the upper one being the shrine for the precious relicts that St. Louis desired to honour. The effect of the lower building seems to have been that of a crypt, in fact, and it was dedicated to the Virgin; the upper chapel is, however, the great object of interest. It is approached through a porch, which is continued by a staircase on one side, that gives access from the bottom level; the plan is very simple, it consists of a large hall, with a polygonal apsis, that is 36 mètres in length, and 9 mètres wide; the height of the two stories, from the soil to the angle of the ridge, is also 36 mètres, so that the height of this building is equal to the length. In the interior, there is not an inch of the surface that is not covered with decorations in encaustic tile, enamelled ware, gold molding, stained glass, &c.; in fact, the prodigality with which the decorative skill of the architect has been lavished upon this monument passes all belief. The tone of the colour that is thus conveyed is, it may be added, warm and

harmonious in the extreme; and the effect is markedly increased by the careful manner in which the stained glass is designed in accordance with the style of the thirteenth century. It may afford the English student matter of reflection upon the progressive development of style in the Mediæval times, to observe how this building, which was erected before the Temple Church, in London, bears traces of the future development of the style of the ornamental perpendicular, which did not prevail in England until long after it had flourished here; for the ornaments that are introduced in the windows and doorways, the tracery, &c., that appears in the windows, are of the most advanced character. The French Government have lately devoted great sums to the restoration of this monument, which have been laid out with singular skill by M. Viollet Leduc, who has evidently made this a labour of love. The carpentry of the turret is an exquisite specimen of the style in which the French people now execute works of this kind; and the tribune and tabernacle in the interior of the chapel are equally worthy of admiration, though, it must be confessed, they are designed in a thin and poor style compared with the joiner's work of the same period in England. Altogether, the Ste. Chapelle is an exquisite gem; and its restoration must be considered the great title to fame of that most eminent artist, Viollet Leduc; the works of restoration are nearly finished, and the chapel will soon be dedicated again to divine service.

The church of St. Gervais may be noticed next in this review of the Mediæval antiquities of Paris, although the frontispiece of the building is the work of Jacques Desbrosses, and was finished in the year 1621. The interior of this church is, however, a fine specimen of the style that prevailed in the later periods of the Flamboyant architecture in France, and the changes that came over the spirit of the Mediævalists may very clearly be perceived in the works that were executed under the reign of Charles VI, about the year 1420. The vaulting of the body of the church is bold, and presents many features of interest, as in the introduction of numerous culs de lampes; the stained glass is peculiar, and was executed, partly in 1530, upon the designs by Pinaigrier, and partly in 1587, upon those of Jean Cousin; but the great interest in this building is attached to the triptych in one of the lateral chapels, that is attributed to Albert Durer. The works of St. Gervaise, have also, to a great extent, escaped the restoring mania that has seized the Corporation of Paris, and they exist nearly as time and circumstances had left them.

Not so, however, the works of that most exquisite specimen of the Flamboyant style, the church of St. Méry. This was built about the year 1520, when, by the way, the architecture of the Renaissance was firmly established in France; but the Mediæval style was preferred for this building, except in the case of the south-western tower and the southern part of the interior, which are executed in a kind of bastard Italian style. The façade has suffered very much from the fighting that so fatally distinguished the Revolutionary epoch, but it still retains traces of supreme elegance in the foliage of the doors, and the buttress that divide the composition, which was formerly surmounted with twelve statues of saints or angels in the gable of the choir. In the interior, the usual Parisian style of disposition is adopted, and the choir is accompanied by a double aisle on either side, that leads up to a transept that runs the whole length of the church. There are lateral chapels, on the south side especially, which are dedicated to our Lady and to the Dead; but the architecture of these is quite distinct from that of the body of the church, and is of the worst time of the rococo style of Louis XV. The decorations of the choir are also of the end of the seventeenth century, and are recorded to be the work of the Brothers Slodtz; they, and the exquisite details of the façade, have hitherto escaped from the "restorers" of the town Council; how long they will do so, of course, depends upon the resources of the city of Paris, which seems determined to put a new face upon every building, as was proved by the attempts that they have lately made to restore the church of St. Leu. This is a small church, that lies a little to the north-west of St. Méry, last noticed, and immediately upon the line of the Boulevard Sebastopol. It is a

tolerable specimen, in its restored state, of the Renaissance; but it is so "spick and span" new that it entirely loses the interest that grows from associations, and leaves the mind without any of the feelings that we usually attach to a place of worship.

The church of St. Nicholas des Champs is a curious specimen of the late Flamboyant style, passing into the style of the Renaissance; it was begun in the year 1420, but was completely altered in 1575 to what it now is, in the greater part at least. It is rather out of proportion, as the length is considerable compared with its width; it is composed of a nave, or choir, and the double aisles on either side, which are characterized by the arches springing directly from the shafts of the columns without the intervention of any capital on the side of the nave, which is part of the original building. The rest of the interior does not present any interest; it is of much more modern style than the part just noticed, and is a tame specimen of the decorations that were in fashion in the times of Louis XIV; the principal interest in this church is the sculpture of the façade, that is much admired, though, I confess, I cannot see much to commend about it. The church of St. Nicholas des Champs seems to be destined soon to pass under the hands of the municipal authorities, and to be as much transformed as the rest of the buildings that they have employed their talents of restoration upon; for the church is situated at the entrance of the new street that leads to the old Marché du Temple, and, therefore, will be in the most busy part of Paris.

But the most important works that have been of late undertaken for the restoration of a series of buildings, or a conventual structure, in Paris, are, without exception, the ones that are connected with the enlargement of the Conservatoire des Arts et Métiers, which has taken place within the limits of the ancient buildings of the Monastery of St. Martin des Champs. There is something striking in the fate of these buildings, for it must furnish to the reflecting mind food for a comparison between the feelings of those who, in the past, dedicated to the service of God the same structure that their descendants devote to educational purposes. The Temple, that once sounded with prayers and praise, now sounds with the noisy clang of hydraulic instruments, and the busy motions of agricultural machinery; while the murmurs of the faithful are changed for the anxious enquiries of the student of natural philosophy. Even the library of this Institution might point a moral, as it is housed in the refectory of the ancient convent, and the monks might find their places filled with the diligent enquirers into the history of human progress in arts and sciences. It may be that there is something appropriate in this change of destination; at any rate, it has furnished the motive of the complete restoration of the buildings of the old conventual establishment of St. Martin des Champs.

These works have been directed by M. Vandoyer, in the mixed spirit of the love of antiquity, and the desire of introducing as far as possible the principles of architecture that are at present in fashion in Paris, that so strangely characterizes the French authorities. In the new buildings, and in much of the old which has forcedly been modified to suit the actual wants of the establishment, the taste of M. Vandoyer may be at once recognized; and it is marked with the usual amount of care and attention to detail, but with the neglect of general effect, owing to the absence of mass, and the shallow profiling of the mouldings, which characterize that artist's productions, and which seem to have been inspired more by the study of the Renaissance than by the more vigorous Mediæval period. The Library of the Conservatoire is, however, as before said, housed in the singular hall that served as a refectory, and it has been fitted up in strict conformity with the original design, as far as it was possible to do with reference to the new use to be made of it. The hall is divided by a range of pillars, that are models of lightness and elegance, upon which the vaulting of the roof is carried. It is impossible to praise too highly the care and attention with which the works for reinstating the decorations of the walls, the stained glass of the windows, the encaustic paving of the floor, and the presses that surround the walls,

are executed. To me there is a disagreeable tone prevalent in the effect of the colouring adopted; but this is a matter of taste, and the diapason once adopted, so to speak, the skill with which all is made to harmonize with it, must be admitted without reserve. But it is in the chapel that M. Vaudoyer has displayed the greatest skill in the adaptation of the ancient buildings to the modern usages. The plan of this building is very simple; it is a choir, terminated with a polygonal apsis, very lofty, and covered with a vaulted roof, which has been restored and the walls decorated, and the windows filled in with stained glass, in strict conformity with the principles of the French school of mediævalists. All around, there are arranged the models of the hydraulic, the agricultural, and the industrial machinery, that are known at the present day; and these models are upon a scale of such a size as to admit of their actual working; thus affording the best lesson that can be read to the intelligent labouring man, for whose instruction they are assembled here. The tone of the colouring of this building is rather warmer than that generally adopted in Paris, and therefore is more pleasing; but the effect of the whole of this magnificent restoration is satisfactory in the extreme, if we can divest our mind of the thought of the profanation of God's house by turning it into an industrial museum. The manner in which M. Vaudoyer has introduced the glazed tiles, in the roofing, may be noticed in passing; it is in character with the architecture of the original buildings, and it harmonizes well with the rest of the work.

I have omitted to notice the tower of St. Jacques la Boucherie that has so signally marked the operations of the municipality in the course of the execution of the works for forming the Rue de Rivoli, because this restoration seems to me to be too much marked with the love of changing old things for new which prevails in Paris at the present day. It is the remainder of a most beautiful monument of the end of the fourteenth, or the beginning of the fifteenth century, when the Flamboyant style was beginning to make itself felt, and it has been restored in the most perfect manner possible, as far as French taste is concerned. The basement has even been added, and the tower now stands isolated without the buildings with which it was associated, and thus seems to be without a motive for its existence. All that has been attempted in the course of this restoration has, in fact, been marked by a strict archæological spirit as far as the tower itself is concerned; but there is about the whole structure too much of an effort, there is too much of the desire to reproduce a Mediæval monument in all the newness of modern work to satisfy the mind of an artist. It may be that there is somewhat of hyper-criticism is thus finding fault with the operations of the city architects in this case; but I think that there are few lovers of antiquity who would not join me in the expression of regret that so much time, money and ingenuity should have been wasted in making the ruined tower of St. Jacques la Boucherie a kind of watch tower upon the line of the new Boulevard. Everything about it is too new, in fact; everything is perfect, and every detail is without defect.

In the remaining parts of Paris, the only work of the Mediæval period that I am acquainted with is the Church of Montmârtre, which is a tolerably well preserved specimen of twelfth century work, and which has hitherto escaped the care of the town architects. It is composed of a nave and two side aisles, which are all terminated in circular apsidæ, that are appropriated to the service of our Lady, and to two small chapels. The altar is advanced into the body of the church to admit of this use, and also to admit the formation of a tribune behind the altar for the purpose of allowing the nuns of Montmârtre to assist at the sacrifice of the mass. The length of the chapel beyond the high altar has been considerably reduced since this building was erected; but with all this, the height is very disproportioned to the width, or length—and the effect of the building is very barn-like; still the evident marks of antiquity that this building retains gives it a peculiar interest in the eyes of an antiquarian and archæologist. As for the other ecclesiastical buildings of Paris, they are I think all of a date subsequent to the times that I have

fixed for this notice, and they are all of the period during which the semi-classical school that prevailed in France since the Bourbons ascended the throne. It may be that I have neglected some of the College chapels, and that I may have overlooked some of the ecclesiastical buildings that lie hidden in the dark streets of the Cité; but I trust that you will excuse me on the score that I only meant to call your attention to the most accessible of the monuments of ancient Paris. The churches of the Rue du Faubourg St. Denis, du Roule, de St. Vincent de Paul, de Notre Dame de Lorette, de la Madeleine, de l'Annunciation, de l'Assumption, de St. Louis en l'Isle, de St. Paul, de St. Antoine, des Bernardins, de la Rue d'Enfer, de la Rue des Saints Pères, &c., are all worthy of notice in their particular ways; but they are designedly left out in this present review, which is meant to be of the Mediæval period only, that is so fast disappearing under the levelling influences of the age. It is with the hope of being able to record the state of these buildings before the period of their restoration that I have ventured to call your attention to them.

In looking back upon the principles that have guided the French architects in their recent works for the purpose of restoration, these two things strike me as the most questionable in the course that they have adopted. They attempt too much; and they communicate a general tone of colour to the buildings that is, to my eyes at least, a cold and disagreeable one. It is not the part of the restorer to replace every defective piece of carving, every moulding that may have suffered from the effects of time, or exposure to the weather, or even to the violence of men's hands. All these destructive agencies may communicate an interest that is of the highest character, and their marks may tell a tale that no modern carving can replace, let it be ever so skilful. The worst of this tendency to replace the carvings is, that the new work can never have the spirit of that it supersedes; it must always be a copy, and therefore it is stiff and formal; it lacks the spirit and the freedom of handling that characterized the original. Mr. Gilbert Scott called the attention of the archaeological world very forcibly to this defect, and he illustrated it by the works lately executed with such perfection of mechanical skill at Notre Dame. In this case M. Viollet Leduc can be accused of having restored the works of the Cathedral literally to death. Everything about the building will be new, sharp, and perfect; there will be nothing left for the imagination to fill up, no play for the fancy to restore "the lines where beauty lingers." Every detail is to be perfect, from the statues in the niches of the façade to the columns of the nave and choir, that are to be dubbed out to the original size in a zinc cement; every moulding and foliated ornament are to be replaced, until the mind loses all interest in the modern work, if it be ever so perfect a "refaciamento" of the original design. Decidedly the French architects err in restoring over much, but it is an error that we in England ought not to reproach them with, when we reflect upon the state of some of our noblest structures, as, for instance, the Chapter House of Westminster. It may be that this tendency to exaggerate the work of restoration springs from the organization of the *Commission des Monuments Historiques*, and the tendency of the French mind to follow the lead that is set them by those in power. This is certain, that since the organization of that body the works that have been undertaken for the repairs of the ancient buildings in France have been carried on with vigour, but with too much unity of design; and the tendency of all the works of restoration has been decidedly towards the introduction everywhere of the style of the Renaissance, with its shallow mouldings and feeble effects.

The question of taste in colour is proverbially one of difficult solution, but I cannot think that the French artists have solved the difficulties that surround the case. In the Ste. Chapelle, it is true that M. Viollet Leduc has displayed consummate skill in the harmony that he has impressed upon all the decorations; but in Notre Dame he seems to me to have adopted a low tone of colour which is very unsatisfactory to the eye. The works are not finished in this case, so that a judgment upon them is

rather premature; the stained glass is, however, in place, and it must enable us to judge of the effect that will be produced when it is completed. Now, it seems to me that there is too great a prevalence of light green and blue and yellow in the patterns, and the body of the stained glass is too often a greenish white, which communicates its colour to the whole mass. It seems to me, also, that the system that the French adopt, of producing their effect by water colours, is likely to produce the cold effect that I allude to; and this is apparent not only in their glass, but also in the painted decorations of their wall surfaces. At any rate, the decorations of St. Eustache, Notre Dame, St. Germain des Près, seem to me open to objection on this score, in variable degrees, of course; the decorative works of St. Martin des Champs, being designed for another purpose than for public worship, are of a different character, and they are more successful. The other churches mentioned are simply restored as far as regards their stone and wood work, they have not yet been tampered with by the decorator's hand. It is to be hoped that if they should be at any future time subject to that fate, the French architects may be led to inquire into the principles of taste in colour, and that they may avoid in their works about to be executed, the garish, cold, and disagreeable effect that they have hitherto impressed upon the monuments that they have restored. The motives of the authorities of the present day are thoroughly good, they seek to honour religion in every manner that they can; it only remains for those whom they employ to examine, in a more catholic spirit, the principles that they introduce in the works of restoration, to place those works beyond criticism. They are so nearly right, that it must be a matter of regret to the man of taste that any exception can be taken to their operations.

I may mention that in the new churches of St. Augustine and the Trinité, and in the church that is being erected on the Boulevard Robert Lenoir, the architects have adopted a style that is a singular mixture of the Lombardic and Renaissance. It is not my intention at present to notice these structures, but I could not refrain from calling your attention to them in this kind of review of Paris ecclesiastical architecture. They display great power and originality, though it can hardly be said that they are designed in any particular style of the classical or Mediæval schools.

Mr. WM. WHITE, Fellow, was very sorry to say that so many years had elapsed since he had seen any of these works that he could add nothing to what Mr. Burnell had said with reference to them. But he thought they might draw one or two conclusions from the subject brought before them this evening, and especially of encouragement as to the work in our own country in comparing the progress of the art in the two countries; more especially in one branch of restoration which was mentioned,—that of over-restoration, in the excessive desire for primness and finish in the old work to make it equal to that of the new. But though he thought we were in a better position in some respects as to the conservative desire for preserving old surfaces than they were abroad, yet he felt strongly that the same impulses amongst the less informed were as prevalent here as there. There was quite as great a desire everywhere to have that primness and neatness of finish even in old work. A year or two ago, when the west front of Winchester Cathedral was scraped so beautifully, some ladies were overheard to say in passing, "Oh, when will they whitewash the rest like this front? It is so beautifully clean and white." Then he thought from the colouring he had seen in modern French churches generally there was generally a very great deal too much spottiness and diffusion instead of breadth and massiveness in the distribution of their colours. That was especially the case in Notre Dame at Paris; but he did not quite agree with the author of the paper as to the cause of the unsatisfactoriness which he spoke of being attributable to the cold greenish glass introduced to so great an extent, but rather to the colours introduced with it. There was in nearly all the French coloured glass too much desire to imitate a transparency painting upon a cold ground, instead of having the cold ground to break up into multi-

tudinous parts the colours which required that cold ground to bring them out, and also to contribute their effect to the surface colouring of the walls. Again, to his mind they shewed greatly too much desire, in their wall work, to put up large panel or pictorial paintings, for which they required a good light, instead of aiming at a general harmony of colouring throughout the building. He thought, too, it must be very evident, indeed, from what Mr. Burnell had said, that the same influences had been at work in the two countries, as was illustrated in the general retrogression and revival of art throughout the French church, as it had been in the English church. People were fond of saying that abroad they had always kept up their art and so forth, simply because they had kept up a great amount of display and gew-gaw decoration about their altars, in opposition, so to say, to the excessive niggardliness and wretched coldness that there had been exhibited about the altars of our own churches: and he thought this retrogression had been gradual with that of the architecture.* He begged to propose a vote of thanks to Mr. Burnell for his very interesting paper.

Mr. JOHN P. SEDDON (Hon. Sec.) remarked that the colouring at Notre Dame could not be presumed to be a restoration. [Mr. DIGBY WYATT: The colouring is on the diapers and mouldings.] Mr. SEDDON had found that in the few remains of colouring in England the true tints of the old colours were rarely followed, and they were generally so garish in modern imitations and so delicate in the original, that they could not be regarded as restorations.

Mr. DIGBY WYATT, Fellow, desired to draw attention to one or two points of some importance which had, he thought, been overlooked both in the paper and in the remarks which had been made upon it. The first and chief was the great and irremediable injury which such a system of over-restoration, as that which Mr. Burnell had described, inflicted upon the historical student. Glowing with veneration for the past, the antiquary visited one of these scraped and renovated monuments only to find the restoration so good as to render it impossible to be quite sure what was old and was new. Standing before some grand old tomb, upon which the effigy of some old worthy might reasonably be supposed to have rested peaceably for many centuries, how often some trifling anachronism or anomaly in costume or armour served alone to betray that the old gentleman after all was only an impostor,—a child of to-day, instead of a chip of the real old block. Even, if after all, the figure had been left intact, while all around had been renovated, there always remained the distracting doubt that all might not be quite right. It might certainly appear an old figure; but yet some trifling detail might betray that it had been tampered with in such a manner as to leave it doubtful whether it might not be a modern statue, at least in its most essential particulars, instead of an old one. Thus it was that the footprints of time were obliterated, and “men trod out their neighbour’s landmarks.” Secondly, with regard to the Saint-Chapelle and its restoration, Mr. Wyatt first saw it in the year 1845 while under the hands of M. Lassus. At that time the great vault had been coated over with a deep colouring of blue, and a commencement had been made with the restoration of the stained glass. One reason why this deep blue vault was in such undue preponderance—as also at St. Denis—was that, for the most part, the French artists executed their mediæval polychromatic decorations in oil instead of in fresco, buono-fresco, secco, or distemper. The want of admixture of lime or of whitening in the process adopted was destructive to the transparency or rather luminosity of the colour. They could not get the same appearance of light if the pigments were blended with any other medium as they could if they were mixed with those which had been chiefly used by the mediæval painters. In estimating the value, merits, or demerits

* Not that the English neglected the adornment of the east ends of their churches, according to their light, in the seventeenth and eighteenth centuries; but there was the same system prevalent in the church abroad as in our own, of flocking up the east window of the chancel by some hideous erection.—W. W.

of their earlier restorations, members should recollect the difficulty which the French had laboured under of suddenly creating a school not only of efficient architects, sculptors, and painters, but of handicraftsmen as well. They began to restore about the year 1840,—stirred a good deal to the task by antiquaries such as Potier, Langlois, De Caumont, Du Sommerard, the Baron Taylor, &c., and writers of the romantic school of Victor Hugo. The spirit moved them then to break away from the exclusively classical and academic traditions which had bound them from the days of David, and to enter zealously upon the work of the restoration of their magnificent but sadly ill-used historical structures. It was about this time that Merimée, Rio, Lassus, Gerente, Didron, Martin, Viollet Le Duc, the Abbé Texier, Seigneur and others instituted their special studies in this direction; but the Government had interested itself in the preservation, if not the restoration, of national monuments prior to that date. Baron Taylor, in the time of Louis Philippe, made an examination of, and published splendid works upon the principal monuments; but that was inadequately done,—too much in the picturesque style of our own John Britton's "Antiquities." A closer investigation was subsequently carried out under better auspices and with great ability, and a large sum was appropriated to the expences of what was intended to be complete restoration. So far as works of maintenance were concerned there was abundance of ability on the part of the French masons to do what was most essential; but in the early stage the great difficulty was to find decorative artists, and especially painters, who would, or could, lend themselves to the old styles. The fire of Rio's eloquence helped to evoke several, and amongst them one of the earliest and most enthusiastic, who died too young for fame and his country, was, if I remember the name rightly, Felix Orsel. Mottez and Maury Duval painted many of the pictures in St. Germain and L'Auxerrois, most of which are very unsatisfactory. The grave character and deep feeling of Flandrin led to his being extensively employed in ecclesiastical polychromy, which was much better done by him than by any others, as witness his decorations executed in connection with the restorations of St. Germain des Prés, St. Severin, &c. His success, more particularly in the grand original works executed by him in a quasi-Byzantine style at St. Vincent de Paul excited the emulation of classicists who began to paint in the various churches with little knowledge and less feeling. Most of such works were crude—neither tranquil in themselves nor harmonising with their surroundings—in restorations, therefore, simply impertinencies. Each artist blazed away at his rival working in an adjoining chapel, to the entire destruction of repose, through his too vigorous self-assertion. So it was, that in looking over the monuments of Paris, and indeed of France generally, restored during the last thirty years, the observer would frequently find the work of the incompetent artist side by side with that of the more experienced and devotional. No one who was acquainted with the monuments of Paris could fail to agree in the general conclusions drawn by Mr. Burnell that the restorations had been overdone. At the same time, however, they ought to be grateful to the French Government, if it was only for the actual preservation of the existence of these monuments,—since, unless a strong will had been exercised in that behalf, ample money provided, and constant watchfulness over them maintained, they would have either tumbled down of themselves or been swept away in the strong blast of renovation and reconstruction which had swept over, and in some respects devastated the picturesque but dirty old Paris of one's youth. If the French had lost some of their landmarks in detail, they had preserved them in their main features at least, which was more than most of the other countries of Europe had done to an equal extent. In the case of the tower of St. Jacques de la Boucherie, which stood in the way of metropolitan improvements, in most other countries it would not probably have been allowed to stand at all under the circumstances of its awkward position and very dilapidated condition. It still, however, remained, though not in all the picturesque beauty of its old condition. The colouring, in which one traced "the lines where beauty lingers," was lovely before the restoration was commenced; but there it was, and there it would now

long remain as a beautiful monument of the century in which it was erected, and of the zeal of the Frenchmen of the nineteenth century for the preservation of their ancient arts. There was, thirdly, one point connected with the French system of care of national structures which was most gratifying. It was, that however much the artists might err in the details of the restorations effected, the Government had not omitted accurately to record the state and condition of the buildings before the restoration was entered upon; and those records were carefully preserved in the archives of the "commission" which thus included every building of note throughout the country. Mr. Wyatt had enjoyed opportunities on more than one occasion of examining some of the portfolios of drawings which had been arranged by the ministry by departments. Every monument of any importance throughout the country has been carefully examined, drawn, measured, and again reduced to scale, whereby any one could hereafter ascertain accurately what the precise condition of any building possessing historical interest was at the time at which this careful survey had been made. Thus, not only were the records of the condition of the buildings preserved, but architects, who were paid to examine, draw, and measure these monuments, acquired in the best way a knowledge of the details of similar structures. It was, indeed, mainly in that way that the French architects charged with the supervision of local antiquities and departmental restorations, had arrived at a fair knowledge of Gothic detail. At the same time, honestly speaking, he (Mr. Wyatt) did not consider the French, as Gothic architects, were to be compared with those of our own country who had specially devoted themselves to the subject of mediæval architecture. A Frenchman was by nature intolerant of tradition; he always desired to manifest himself personally in some way for good or for evil; and would endeavour even to be eccentric, rather than not be esteemed to be original. Struggling constantly to remove himself as far away from tradition as possible, the great object of his life was on all occasions to be able to say, "Ah! c'est moi." It was precisely this principle of self-assertion, rather than of subordination to the precepts inculcated by the wisdom of the past, which had chiefly marred the general characteristics of the magnificent monumental restorations which France had inaugurated with great zeal, at great cost, and with no little ability and erudition.

Mr EDWARD HALL, F.S.A., Visitor, said he had very little to add after what had fallen from Mr. Wyatt. He was glad to hear it remarked that a Frenchman was somewhat intolerant of tradition; for, this implied that he was the greater artist. Mr. Hall said he might, however, offer one or two observations. With reference to the decorations of the churches, it was necessary to take into account the obligation that the government and municipal authorities have always felt themselves under to provide work for the French artists. Without taking that into consideration, they could scarcely understand the great prevalence of decoration, and what was one result of the necessity of providing work, namely that the undertaking or commissioning of the work had sometimes been in advance of the ability to execute it. That he thought was nearly all that it was important to add to what Mr. Burnell had said. There was, however, one point on which he slightly disagreed with him. He did not himself think the effect from the stained glass was quite so inimical to the effect of the *architecture* as that gentleman considered: but that it diminished the effect of the paintings was obvious. It would be recollected by many present, that at the time of the building of the Houses of Parliament, when it was first proposed to decorate them in fresco, the question was much discussed whether it was desirable to combine the mural decoration of the building with the effects resulting from stained glass. With reference to the decoration of the church of St. Germain des Prés there were some points of interest. For the study of the polychromatic decoration of buildings, the work executed there was important. It seemed to him that the capitals were injured by the gilding and colouring. It might be urged that something of the kind was required in the case of such details; for, prior to the colouring, in the darker recesses of the building the forms could be made out only with a certain amount of difficulty: but, now, the nice undu-

lations of the foliage of the capitals were destroyed by the gilding upon them. The case was one to which he thought some attention might usefully be given by those interested in polychromy. Mr. Burnell had mentioned some of the works of high historic art that there were in the Gothic churches. At St. Séverin, as well as at St. Germain des Prés, there were some magnificent works of this class of art; and they must give to the French, credit for those works of historical art in their decoration (works finer than were to be found anywhere else than in France), while they were inscribing something on the other side of the account in respect of the ordinary decorative painting of their churches. With reference to the restorations of Notre Dame at Paris, he apprehended there were details which an English architect would not approve of—such, for instance, as the ornamentation of the gable of the south transept—which seemed to him very un-Gothic indeed. With regard to the *silicatisation*, for the preservation of the stone, those who visited Amiens Cathedral would be interested in noticing the result of the process there. He believed it had been tested there for a longer period than at Notre Dame in Paris; and the result appeared to him highly successful. The work had been done under M. Viollet-le-Duc; and, when he (Mr. Hall) visited the building, on trying to chip a portion of the stone, in one of the most exposed parts of the tower, he could make no impression upon it. The stone had evidently been much indurated by the process. Moreover, he thought that the atmosphere of Amiens was smoky as compared with that of Paris, and might subject the stone to a more severe test. With regard to the church of St. Leu, on the Boulevard de Sebastopol, in Paris, he would observe that the “restoration,” or rather alteration, there, was due to a portion of the eastern part of the church being intersected by the line of the boulevard. It had been, in fact, necessary to shorten the church; and it had always appeared to him that the re-construction had been managed with remarkable skill. He did not know any of the later works which pleased him more; and he thought that the east end of the church, in the disposition of plan, if not in the adaptation of its decorative details, was, under the peculiar circumstances of the case, particularly successful.

MR. DIGBY WYATT begged permission to offer two additional remarks—one was to call attention particularly to the great good judgment displayed by so strong a mediævalist as M. Viollet Le Duc, in recognising, and consenting to the preservation of, the rare beauty which was displayed in the woodwork of the stalls of Notre Dame de Paris, of the time of Louis XIV.. Mr. Wyatt had always looked upon this as some of the most exquisitely carved woodwork in the world. The *cutting*, in the freedom of handling of the chisel, was absolutely lovely. He had obtained castings of some of the panels for the Crystal Palace at Sydenham. Though this woodwork was of a period subject to much reproach in many respects, particularly at the hands of staunch mediævalists, still he doubted whether it would be possible to point out a finer specimen of carved woodwork; and he therefore considered that M. Viollet Le Duc had shown a truly catholic spirit in preserving these stalls, &c., as he had done.* The other remark was that Mr. Burnell, in enumerating the good qualities of the work connected with the Sainte Chapelle, had not done (Mr. Wyatt thought) full justice to the admirable restoration of the lead work under M. Le Duc. He (Mr. Wyatt) did not know of any such specimen of the revival of ancient lead work elsewhere as was to be found there. The grand scale upon which the flèche was conceived, the skilful “bossing” of the lead, the ingenuity displayed in binding it to the wood work, and giving it in every position such skilful overlapping as to allow of expansion and

* M. Viollet le Duc, in his “Dictionnaire,” (Vol. vi, page 352,) while he finds fault with the structure of these stalls, does justice to their beauty in the following terms:—“Nous avons souvent été appelé à démonter des œuvres de menuiserie des “XVII^{me} et XVIII^{me} siècles. On ne comprend pas comment une sculpture, souvent aussi délicate, une ornementation “charmante, s’allie à une structure aussi grossière et peu raisonnée.”

contraction under varying temperatures, at the same time preventing access of wet to the timber framework, were particularly worthy of notice,—more especially since this revival of skilful plumbing was a matter which architects had habitually too much neglected.

PROFESSOR KERR, Fellow, said he had been pleased to notice the respect with which in the present discussion French architects had been spoken of, contrasting favourably with remarks which on previous occasions had been hazarded respecting their peculiar mode of restoring mediæval buildings; for he thought it was calculated to reflect discredit upon this Institute when members spoke of French architects with disfavour. The fact was, the French idea of restoration and the English idea of restoration were two different things. The French ideas of restoration existed certainly with as much authority, if not apparently with as much reason, as our own; and English architects ought to look at the mode of French restoration not merely dispassionately, but with a view to ascertain by comparison of the two systems whether a lesson might be learnt. Taking the instance of mediæval churches, as the best ground of comparison, it was readily seen what was the difference between the French idea and the English idea. Let the argument for restoration be put thus:—we possess a large number of churches throughout the country which have existed from 500 to 800 years,—which originally were consecrated to purposes of religion,—which have been uninterruptedly used ever since for those purposes (for although we had changed our religion and manners in many details during the interval, we had changed nothing which affected the use of these buildings:) and now as they have fallen into decay it is reasonable that we should restore them. But if the character of the English mind with reference to ancient monuments was such (and he himself approved it highly) that we viewed those churches with a large amount of traditional veneration, it did not follow that we should expect the same views to exist in other countries of the world; and it did not in his opinion become us to throw discredit on the good taste of those countries where it happened not to exist. A catechism, as it were, of the restoration of English churches had been published by this Institute, in the form of a document which was put forth about a year ago: it was very complete: members, individually, might agree with its principles, or might not, but those principles were laid down clearly as the views upon which the leaders of restorative practice professed to work. He did not know that any similar manifesto had been issued by the French architects: but Mr. Digby Wyatt had pointed out at least this important circumstance which seemed highly creditable to the French, namely, that before commencing to restore, they take pains to make a correct record of the condition of the building. English architects restored without recording, and perhaps a good many of the differences of opinion which afterwards occurred with reference to works of restoration might be avoided if we adopted the rule of the French in this particular. At all events, he would submit this formula as likely to be universally accepted in this country,—that he is the best restorer of mediæval churches who best combines the restoration of their utility with the preservation of their identity. Now the French would beyond all doubt go thus far with us heartily: but the two nations seemed immediately to part company when the next question was propounded, namely, which of those elements should assume the preponderance—the utility or the identity? The French appear to say the utility: we say the identity. Mr. Digby Wyatt had hinted at the well-known difference of national character; he would now attempt to put the same idea in another light. The typical Englishman was satisfied with the present; and satisfied with the past as a part of the present: the Frenchman was not satisfied with the present,—he was aspiring after a future,—he turned his back upon the past as a thing overthrown. Here was a radical difference of sentiment between two races upon the question of traditional value which would give rise in a great many respects to differences of practice, and with regard to such a matter as the restoration of mediæval buildings in particular must distinctly show itself. If that were so, how could we expect the

French to abandon their system and adopt ours? We might express regret that what we hold to be the identity of their monuments was being destroyed: but we could not interfere: the best thing we could do was to learn what lesson we could from this difference of national practice; and if we felt the more satisfied with our own works of restoration, or those of them which most closely accord with our governing ideas, this was enough. It was therefore in very questionable taste to denounce the French system, however strongly we might feel that the English system was a better one. It might be argued against ourselves that in some cases identity was preserved at the sacrifice of utility; although those who were the best judges were of opinion that the contrary was most frequently the case, even in this country. On the whole, no doubt there was room for improvement on both sides of the channel, without disparagement on either part.

Mr. THOMAS MORRIS, Associate, remarked on the subject of recording the original condition of buildings restored, that, in the case of St. Stephen's Chapel, Mr. Mackenzie and others had been employed to make an accurate representation of that work, which was carefully engraved, and a copy was in the library of the Institute.

Mr. WHITE would say one word in disagreement with what Professor Kerr had said with reference to the sacrifice of utility to identity in the restoration of ancient churches. He thought it very likely indeed that many did that; but he thought those who did so had very little feeling and perception of those elements of essential church architecture which were generally recognised in our restorations.

Professor KERR said Mr. White had quite misunderstood him. What he said was, he believed occasionally some architects would sacrifice utility to identity; but that he understood from the reports of those who were best informed on the subject that was seldom the case.

Mr. JOHN P. SEDDON, appreciating most fully the kind feelings which had prompted the remarks of Professor Kerr, nevertheless felt bound to say that in his opinion the French restorations were most reprehensible, and this simply because that in them the question of utility was not regarded, but the most useless things were constantly done for the sake of making the work look pretty and new. He thought it was their duty to express their honest opinion on this subject.

Mr. SPENCER BELL expressed his dissent from the views enunciated by Professor Kerr. In his opinion the buildings which had been placed under the hands of the French restorers were valueless as historical monuments. They ought to separate the two questions of veneration for ecclesiastical buildings and veneration for architectural monuments for their antiquity. They were distinct ideas, neither of which seemed to be regarded by the French. The warmth of their artistic energy should rather be expressed in their new buildings; but as trustees for future generations they should endeavour to preserve the original characteristics of their ancient monuments. In two or three centuries hence it would be impossible to distinguish the difference between the ancient and modern structures, and they would be valueless as historical monuments.

Mr. C. F. HAYWARD (Hon. Sec.) said they would be valueless for all other purposes, and what was the value of what had been done in the old town of Carcassonne? In its isolated position, with no chance of its ever being decently inhabited, what was its value as an historical monument? What it would be in a few years' time no one could tell, except a paltry plaything. He visited that town last autumn, and went away with a feeling of extreme disgust with the restoration there. He had the utmost veneration for the genius of M. Le Duc, and for the works he had carried out, but he thought all the money that was being spent on that town was doing no good to the architecture of France, or to the town itself. There was, perhaps, no better example of the useless restorations going on in France than was afforded in the old town of Carcassonne.

Mr. BURGESS, Fellow, differed from Mr. Hayward. It was one of those things which would bear

restoration, because there was no art to destroy. It had been restored in the most perfect manner, and afforded a good idea of the military architecture of the middle ages, and in that respect he thought M. Le Duc deserved immense credit. It was valuable, inasmuch as it was a page for them to learn from. Admitting M. Le Duc's great genius, he did not give unqualified approval to all his works.

Mr. DIGBY WYATT thought in the case of Carcassonne all purposes would have been answered by a model placed in one of the museums of France.

Mr. C. F. HAYWARD was quite of that opinion, and students would have taken an interest in it. The cathedral itself was one of the most beautiful monuments of France. It had been restored to the utmost extent—the western tower to a degree which almost amounted to a re-building. From the records of that structure they could gather what a beautiful building it was before it was touched.

Professor KERR would be sorry it should be supposed that he had any intention of discouraging the particular ideas which prevailed with regard to restorations in England. All he contended for was that they should allow the French to make a virtue of necessity, and let them to do as they wished with their own.

Mr. E. HALL remarked that in many of the French towns, such as Lisle, the fortifications were being destroyed on account of the inconvenience to the health of the inhabitants.

The CHAIRMAN said all he had to remark with regard to English restorations was, that he had Lincoln Cathedral in his mind, and the fact that, notwithstanding the remonstrances that had been made from time to time, that work was still going on.

A vote of thanks was then unanimously accorded to Mr. Burnell for his paper, and the meeting adjourned.

REMARKS ON THE EVIDENCE OF ARCHITECTS CONCERNING THE OBSTRUCTION OF ANCIENT LIGHTS, AND ON THE PRACTICE OF PROOF BY MEASUREMENT; WITH REFERENCE TO RECENT CASES IN THE COURTS OF EQUITY.

By PROFESSOR KERR, Fellow.

Delivered at the Ordinary General Meeting of the Royal Institute of British Architects, April 30, 1866.

PROFESSOR KERR would commence by laying before the meeting a concise statement of the practical operation of the law on Ancient Lights. It must be admitted, at starting, that perhaps there was nothing which could more truly be called the enemy of the architect, the stern opponent of building improvement, especially in the metropolis. For example, one of those who were listening to him might be engaged in erecting, say in the City of London, some valuable building,—not merely valuable as a work of art—he would not ask the law to trouble itself with that question,—but, in the most simple utilitarian sense, valuable as an improvement of property; he had cleared an extensive and costly site, swept away a mass of inferior, unwholesome, and almost useless buildings, and his purpose now was to create in their stead something which should be worthy of the cost of this demolition, worthy of the advancing intelligence of the age, worthy of the enterprise of England, worthy of all the science that building could command. All unconscious of offence, he proposed to utilize his ground to the utmost; to cover every available part, to elevate his building boldly to meet the demands of spaciousness, healthfulness, cheerfulness, stately aspect, and commercial benefit both to the individual proprietor and to the community at large. Suddenly he would receive an intimation that there existed some little window in some shabby neighbouring tenement, of which he had taken no account, but which, in the eye of the law, possessed a certain control of his proposed great building,—a control, when it came to develop itself, of singularly reckless, uncompromising, selfish strictness. In vain he might plead that he was only building on his own ground, that a considerable distance intervened between his operations and the exacting window, that actually a street intervened, or the property of a third party, or what not; the owner of the window had only to apply to the Court of Chancery, and the great building was absolutely prohibited from raising its head towards the free sky beyond a certain ancient height, or stretching itself on its own bed beyond a certain ancient limit. Drawn, as this picture obviously was, altogether from the architect's point of view, it might be safely affirmed that anything more oppressive than all this, anything more outrageous to the common sense of the uninitiated, it was scarcely possible to conceive.

Nevertheless, such was the law; and knowing, as he did, how strongly some high architectural authorities present might be expected to advocate its alteration, and cordially sympathising, as he himself did, with the feelings which actuated such advocacy, and being fully aware, as he was, that even Lord Chancellors did not hesitate to deplore the effect of the decisions they were pronouncing, and to suggest that the time had possibly come for the legislature to interfere (both Lord Westbury and Lord Cranworth),—yet, as one who had very attentively considered the bearings of the question on purely practical ground, he was sorry to say he had come to the definite conclusion that no material alteration of the law, in respect of principle, would be found possible. To illustrate this, he would suppose, for example, that that meeting, composed of an unusually large number of practical architects, had assembled for the purpose of devising a new law of lighting for a new London. He might suggest, as a not unlikely

been accustomed to breed canaries in a certain dark corner of his room, no sooner had his neighbour some fifty feet off raised a certain wall quite inconsiderably, than the canaries struck for light—promptly refused any longer to replenish the earth. There was only one way in which, as he thought, experiment might be reasonably offered by way of direct evidence of injury to lighting. Let a temporary erection first be put up to correspond with the old state of things, and let a second erection, probably a screen of tarpaulins, be contrived to represent the new, let expert judges of lighting, choosing the precise hour of the day applicable to the case (if such were possible), and the precise atmospheric conditions, probably the early evening of a dull day, station themselves in the room supposed to be injured, and carefully watch; then let the tarpaulins be suddenly lowered and the effect observed. But even this course, however specious in theory, would in his opinion seldom if ever be of any practical avail; for when it was considered how multifarious were the accidental circumstances by which the ultimate judgment might be affected—from the passing change of a cloud to the winking of the observer's eye,—he might safely assert that even in this elaborate form, the direct testimony of the sense would be as unreliable as ever. There was, therefore, left to them but one alternative—to accept the indirect evidence of experts, the professional opinions of architects.

Speaking to an assembly of scientific men, he would next venture without apology to suggest that if scientific opinion were worth anything it ought to be capable of test by proof. Looking at the general tenor of surveyors' evidence in Light cases as shown by scores of affidavits which could be referred to, it was but too plain that it very seldom indeed went farther than the simple dogmatic assertion of an empirical opinion. Mr. A. has been in practice thirty years; and from his experience pronounces the alleged injury to the plaintiff's light to be very material. Mr. B. has been in practice forty years, and pronounces the injury to be absolutely nil. Mr. C., of fifty years' experience, cautiously affirms that a certain amount of damage must be admitted, but that it cannot, in his judgment, be designated as substantial damage. Mr. D., boasting of only twenty years' experience, makes up for the deficiency of age by decision of character, and declares his conviction to be that, instead of being injured, the plaintiff will be largely benefited. Surely, it was not too much to say that such evidence as this was quite unworthy of the profession of architects. What, then, could be devised as a means of proof?

When such evidence as he had alluded to happened occasionally to enter into argument, there was one principle upon which everybody appeared to agree, namely, that the obstruction of sky-surface was an obstruction of light. Reducing this to a definite proposition, it must ultimately take this form—that the light in question being *diffused light*, (not direct sunlight—any more than moonlight—but the dull lighting of a clouded sky, not taken at noon when light was at its best, but at the decline of the day when there would be just enough and none to spare,) the sky might be considered as equivalent to a vast reflector, every point of which yielded its equal share of lighting to the window in question—in other words, that the window was placed in the centre and focus of a half hemisphere of sky-surface as the source of its lighting. He believed that all experiment and reasoning, whether of theoretical or practical men, would invariably confirm this view of the case as one which was to all intents and purposes sound and reliable. What, then, followed? Obviously this suggestion,—why not attempt to measure window light by measuring sky-surface?

The lecturer then proceeded to illustrate, by the help of diagrams, the minutiae of his published calculations; whereby he considered he had succeeded in mapping out in regular divisions the half hemisphere of sky pertaining to any window, and in attaching to each division its precise comparative lighting value. (He begged leave also to take the opportunity of explaining the reason why he was thus engaged in going over ground which he had previously laid down in a book,—viz., because his most

scientific friends had advised him that the book was much less intelligible than he had supposed, and that it was therefore desirable to take an early opportunity of describing the matter personally and familiarly before his brethren at the Institute.) The diagram which resulted (see engraving "Square Projection,") thus represented the half hemisphere of reflecting sky-surface, on what might be called Mercator's projection, equally divided horizontally from the front to each side, and vertically from horizon to zenith; and it seemed plain enough that if any case of lighting were drawn in a sort of perspective upon this diagram, showing the old state of obstruction in contrast with the new, no more was needed to reduce the enquiry to a simple comparison of figures. If the former extent of exposed sky-surface, for instance, stood at the value of one hundred measures, and the proposed future extent at fifty, the diminution threatened was equal to exactly one-half of the old lighting, and this might be taken as proved.

Another form for the diagram would be based on the ordinary circular system of geographical maps (see engraving "Circular Projection"), the horizon being represented as a semicircle and the zenith as its centre, with what might be called parallels of latitude and longitude in the usual way; the figures representing the value of the several sections remaining as in the former diagram.

The way in which to represent upon either of these diagrams the circumstances of a case in hand was simple enough. Taking a block plan of the premises and drawing a semicircle in front of the centre of the window in question, divided to correspond with the diagram, the position laterally of any required point became determined by drawing a line on the plan to that point from the centre of the window and marking where it cut the semicircle. (See engraving.) The position of anything vertically could be ascertained in a similar manner by means of a corresponding sectional drawing (see engraving), on which, in every case, the distance of the object in question from the window being laid down and its height set up from a datum level, a line drawn through the resulting point to the centre of the window would give the vertical projection. The circumstance that horizontal straight lines came to be developed in an elliptical form would create no difficulty after a little practice; and, of course, in the circular projection it would be found that all vertical lines came to radiate towards the zenith,—which also would be easy enough to deal with. (See engraving.)

But it was now to be observed that up to that point they had only arrived at the means of ascertaining the *comparative* abstraction of lighting power; and that would be of no service unless the relation of the size of the window to the size of the room, and of both to the amount of lighting power possessed, could be introduced into the calculation. In a word it became necessary to look about for a standard of requisite lighting:—that which the law desired to protect was only the *necessary* lighting, and they must agree somehow upon a minimum of necessity. Here there was more difficulty in appearance than in reality. For his own part he had taken the following means:—he looked about for a class of rooms which most persons might be expected to accept as being just sufficiently lighted and no more; and he considered he found such a class of rooms in the dining rooms of the ordinary London streets, in Belgravia, Marylebone, and Bloomsbury. It would be matter of opinion of course; but he thought these rooms might be taken as a fair standard,—leaning, if at all, towards the side of the defendant, as ought to be the case. Now, what were the conditions of lighting here? They were matter of mere measurement; and he made them out to take this form,—one foot of width of window to fifty superficial feet of floor, with the opposite houses cutting off the sky at an angle of forty-five degrees all along the front. The window was, of course, supposed to be of the usual height, and the room of usual form; and any exceptional case would be subject to exceptional treatment. Thus a room 20 feet by 20 would have two windows 4 feet wide, with the houses over the way equal in height to the width of the street. Taking, therefore, the figured diagram of the sky, which they had before arrived at (see engraving), and laying down thereon the horizontal line of forty-five degrees just referred to (it would

be an elliptical line), the amount of exposed sky-surface left above it would prove to be 68 measures. Therefore, the rule would now take this shape,—one foot of window width to 50 feet of floor at 68 measures of sky-surface would be the minimum of necessary lighting. When the proportion of window width to the floor was larger, the lighting required would be less; when the window was smaller, the lighting required would be more; and the calculation of this would be the application of the standard; but it must be manifest that if this rule could be accepted, it supplied all that was wanted to enable the architect to turn his diagram to account,—he had now ascertained, not merely the proportion of diminution, but the bearing of this upon the legal limit of necessity.

The lecturer then proceeded to make some running remarks upon recent cases, and, first, he would take the case of *Stokes v. The City Offices' Company*, decided about a year ago. His friend Professor Donaldson, he knew, felt very strongly upon this case; he having been retained for the defendants; while Messrs. I'Anson, Hesketh, and others, with himself, were on the other side. The evidence was of the usual type, more dogmatic than otherwise, although by no means deficient in argumentativeness; and the result of it all was that a handsome and costly public building was ordered to be cut down deplorably to meet the claims of an ironmonger's shop on the other side of the street. He himself, although helping the result, thought this very hard; but it was the law. He would not however go into this case (especially as no sort of measurement, such as he now advocated, was introduced), but would content himself with quoting a clause from Mr. I'Anson's evidence: "The quantity of light which passes through any given window must depend upon the sky-surface which is visible therefrom, or which gives or reflects light thereto." He quoted this in order to point out that all architects were agreed upon this; which was the one maxim upon which the whole structure of the theory of measurement which he had ventured to submit to the meeting was based.

He would next advert to the celebrated series of cases against the *Auction Mart Company*, just decided by Vice-Chancellor Wood. Their friend Mr. Somers Clarke had been engaged upon a very fine building in the heart of the City, near the corner of Tokenhouse Yard; and he had proceeded to a considerable extent, no doubt to the satisfaction of all who were immediately concerned, when it presently appeared that he was unintentionally jeopardising the ancient lights of two adjoining houses. The lessees of one, Messrs. Pilgrim and Phillips, filed their bill; the lessees of the other, Messrs. Dent, Palmer and Co., filed their bill; the freeholders, the Mercers' Company, filed their bill. The architect unfortunately resisted: the three causes proceeded abreast; affidavits upon affidavits, replies upon rejoinders, rejoinders upon replies, poured in, as the sea might pour into an unhappy vessel from three great leaks at once; and at last, after what might fairly be called a very gallant struggle on the part of an unusually large number of eminent witnesses for the defence, the decree came out the other day more disastrously than even their opponents could have expected, and the building was positively ordered to be pulled down to such an extent as no doubt to make its owners wish it had never been built at all. It was in these cases that he himself had first applied the system of measurement which he had had the honour to explain to the meeting; and the results were perfectly definite, and in his opinion perfectly reliable. (The lecturer drew some diagrams of explanation.) He wished especially to mention one instance by which this application of measurement seemed to be somewhat remarkably tested. A certain ground floor room, called in the documents Mr. Phillips's room, looked out upon an open space; St. Mildred's church was in front, the right hand side was tolerably clear of sky obstruction above a reasonable angle, and the left hand side had the new building standing at right angles to the window. Mr. Somers Clarke obviously thought it was impossible that any detriment could be occasioned to this window by bringing his new wall a few feet further forward towards it, or by making his new wall also a good deal higher; but the occupant thought otherwise,—he was certain, he said, from experience that the encroachment

could not be permitted. Surveyors declined to support his view; the lecturer himself, among the rest, declined, upon the mere appearance of the case, to do so, and therefore took other ground of evidence. At last (having in the meantime perfected his theory of measurement) he could not help saying to Mr. Phillips one day that he should be strongly tempted to make a diagram of the lighting of this window, but for the embarrassment which the knowledge of the result might occasion. The lighting in front seemed so ample, and that on one side also, that it appeared impossible to the eye of an architect that any obstruction on the other side, however close and however lofty, could diminish it. But it happened one evening, when he was engaged upon some other diagram in the Mercers' case, that he could no longer resist temptation, and determined to make the experiment and conceal the anticipated result. The figures, however, came out very differently from his expectations, and "direct evidence" for once triumphed over at least dogmatic opinion. The statement of Mr. Phillips had been this, "I never had sufficient light before; and I cannot spare *any* of what I had." The reply of half-a-dozen architects had been this, "You must have had abundant light; and the proposed abstraction can never be felt." The result of measurement was this:—The lighting formerly possessed (the window being by no means wide) was 61 measures, the proposed abstraction was $10\frac{1}{2}$, it was therefore a fact, in spite of appearances, that the original lighting had been less than the minimum of necessity, and that one-sixth of it was to be taken away.

Another case he would mention was that of *Ravenhill v. Brown*, made a matter of reference before a very able and intelligent barrister. It was the case of the shoemaker's window and the neighbour's gangway which he had hinted at before. The referee viewed the place, and, looking at the gangway from the outside, shook his head and said it certainly seemed an obstruction to *some* extent and a case for *some* damages. He, however, was asked to look at the thing, not from without, but from within; to put his eye, in fact, to the centre of the window inside; and when he did so, he could scarcely see the gangway at all. The diagram of admeasurement was then produced and explained; and the way in which the obstruction was geometrically driven into a corner, and by positive proof of figures reduced to the inappreciable quantity of 3 per cent., settled the case.

Mason v. Read was a peculiar case, in which a Fellow of the Institute had somewhat audaciously proceeded to build an extensive edifice in the city directly in front of one half of a neighbouring window. The diagram was resorted to; the new building loomed very large upon it, and the sky surface became wofully straitened. But he had the pleasure of finding after all that *proof* saved the building. The plaintiff had some time before enlarged his window, so as to embrace almost the entire side of the room; and by reason of this he had of course so much reduced the limit of necessity as regarded sky surface, that the amount proposed to be left unobscured by the new building proved to be enough.

The case of *Arden v. Parry* was one which strikingly exemplified the force of the principle which he was disposed to say ought to be held of universal application in disputes about light, namely, that the decision ought to be effected, not by lawyers, but by architects. The subject of dispute was a new theatre in Holborn; the owner of some adjoining houses affirming, and rightly so, that his window light was to be damaged. There was the usual amount of direct evidence, turning upon such points as whether a man could see to cut beef and ham at a certain table, or whether another could see to take money at a certain door, and so on; but when the affidavits came to be read and commented upon before Vice-Chancellor Stuart, his Honour appeared to be impressed with the desirableness of suffering technical pleadings to give way to practical adjustment, and so thought fit to send for one of the plaintiff's professional witnesses (in fact the lecturer himself), and claim his impartial assistance for the promotion of a settlement. Some compromise having been hinted at, by way of reducing the intended

height of the new building, the judge put before him in writing three questions,—the counsel for the defence, by the way, protesting earnestly against so unprecedented and dangerous a course. The questions were, first, what would be the real effect of the compromise which had been suggested; secondly, what would be the further effect of a certain further concession; and thirdly, if after even this, the plaintiff's lighting would still be materially damaged, what further concession would relieve him? The result of this, perhaps illegal, but certainly sensible measure was most effectual. Next morning the report was presented to the court, giving definite measurements upon the first and second questions, and a definite proposal upon the third; and in a very short time the surveyors of the parties, proceeding to the ground with the report in their hands, agreed upon a certain modification which settled the dispute. *

If he could now be permitted to direct the attention of the meeting to a few miscellaneous questions of interest, this would be all that time would admit of.

First he would refer to the test line or limit of lighting which it was not unusual to lay down, drawn from the summit of the old obstruction to the sill of the window to be affected; the supposed rule being that the new obstruction need only be confined within the limit thus represented, and no damage could be done. It was a very specious principle, and had certainly seemed to himself for a long time to be indisputable; but in the Auction Mart cases it had been entirely demolished. The proper rule was to apply this line (drawn to the *sill*) only to intended obstructions in front of the old summit, and to test any obstruction in the rear of that summit by a line drawn therefrom to the *head* of the window.

* As an illustration of the form assumed by a process of adjustment of this kind, it may be useful to append the report *in extenso*.

February 14th, 1866.

ARDEN v. PARRY.

Answers to the foregoing Questions.

1.—Taking the modified plan of the defendants, whereby the side wall of the theatre generally is proposed to be lowered 8 feet, the roof being kept of the same form as before, but the said 8 feet lower in level, and whereby secondly the northern half of the length of the said side wall is proposed to be lowered 3 feet more, the roof being there formed with a curb or second slope, I say as follows :—

That in the house No. 9, Warwick Court, the lighting of the ground floor window would be quite uninjured. That the lighting of the first floor window would be diminished about one ninth part thereof; and that as it was formerly in my opinion sufficiently but not at all excessively lighted, I consider this diminution to be what most persons would deem a substantial injury.

That in the house No. 10 the ground floor window was by my estimate very insufficiently lighted before, and that the diminution would be about two-sevenths thereof. That the first floor window I consider to have been formerly just sufficiently lighted, and that I estimate the diminution at one-third.

That the house No. 11, may, I think, be considered to be nearly in the same case as No. 9.

Therefore that Nos. 9 and 11 would in my opinion, be substantially injured in respect of the first floor only, and not then in a great degree; but that No. 10 would be injured in respect of both the ground and the first floors, and very materially.

2.—That as regards the proposed curb roof for the northern part, and its continuation if necessary throughout the southern part also, I do not find the formation of such a curb to be in either case of any real service to the plaintiff's lighting, as it scarcely touches the sky limit.

3.—That the question what would be a reasonable modification of the defendant's plan in this case is a difficult one to answer, unless I were informed as to the peculiar necessities of the defendant's building; but that, looking only at the plaintiff's easements of light, I would venture to submit that if the defendant's side wall could be lowered 10 feet throughout, instead of partly 8 feet and partly 11 feet, keeping the roof of the original shape (except as hereafter provided) only the said 10 feet lower in level, I do not see that the plaintiff would suffer materially in the circumstances. But this is provided the elevated central portion of the said roof (being as I am informed a ventilator), were depressed to the general line; because as at present designed it serves of itself to obstruct a considerable portion of sky-surface as regards all the first floor windows.

NOTE.—That the above results are based upon special diagrams and calculations which I have made, and that they refer to light alone and not to air.

(Signed,)

ROBERT KERR.

The rule of the angle of 45 degrees was a thing that deserved mention. It had been the custom of surveyors to say that so long as an obstruction did not encroach beyond an angle of 45 degrees, whether taken vertically or laterally, no harm could be done. They had no sort of reason to assign; but it seemed a sort of half-way point between everything and nothing, just as in the old rule for the width of streets—that they should be in no case narrower than the height of the houses. Measurement, however, not only superseded such a rule of lighting, but proved it to be utterly valueless.

The re-adjustment of old easements of light to suit new circumstances, was a question in which he could not help feeling much interest. He believed that in almost every case the fair play of the English character would be satisfied with such re-adjustment if the law would allow it to be effected. Vice-Chancellor Wood, in deciding the Auction Mart cases, had clearly pointed out that nothing of the kind could be *forced* upon a plaintiff; but although this was clear enough, yet it was equally clear that such a compromise *by consent* might somehow or other almost always be accomplished. In fact, were it not for what might be called the clandestine application of this principle every day, by neighbours between themselves, the law courts would be full of disputes about light.

The glazed tile argument—in other words, the proposal to compensate for diminished light by providing a reflecting surface—had received its *quietus* in the Auction Mart cases. The Court spoke of it in unusually strong language,—that whenever proposed it had been “scouted,” that it was “preposterous,” and so on; for indeed it was an obvious point of law that no value could be allowed to attach to the provision of such a reflection by one’s neighbour, unless the perpetuity of the arrangement could be made matter of right over that neighbour’s property, which would be impossible.

The case of *Clarke v. Clarke* ought to be alluded to, and in connection with another case, *Yates v. Jack*. The latter case was in fact a sort of correction of a supposed error in the former, which had threatened to upset all preconceived notions of law in this matter. The present Lord Chancellor Cranworth in delivering judgment on appeal in *Clarke v. Clarke* had happened to drop a passing remark—quite non-essential in the case—to the effect that people living in populous towns could not expect to preserve the same degree of lighting with people living in the open country. Thereupon, in every light case that arose, “Clarke and Clarke” was sure to be introduced, on the pretence that the law was at length altered and amended by Lord Cranworth; and whatever might be the question at issue, all the ingenuity of counsel on both sides seemed to be reserved for the wearisome discussion of “Clarke and Clarke.” Even Vice-Chancellor Wood, (to whom light cases happened to be chiefly taken) hesitated to act any longer on the accustomed ground, until the ghost of “Clarke and Clarke” should be laid to rest. Vice-Chancellor Stuart dealt with the matter more brusquely. He denied that the Lord Chancellor had ever declared anything of the sort, in the sense attributed to his words; it could not possibly be, he said, or the conclusion would be inevitable that the Lord Chancellor proposed to make it law that the less light a man had the less protection he should have for it, which would be absurd. At length another case went up to the Lord Chancellor on appeal, *Yates v. Jack*; and his lordship’s judgment was waited for with unusual anxiety, in the hope that the alleged new law of *Clarke v. Clarke* would be either explained or abandoned. Amongst other things the decision of the important cases against the Auction Mart Company was delayed till the upper Court should thus declare itself. The decision came the other day; it simply restored in all its integrity the old law, and no more would now be heard of “Clarke v. Clarke.” This was not a bad illustration of the difficulty of effecting any alteration of the law.

The lecturer, after alluding to the occasional introduction of a jury in light cases, which he considered a very clumsy and unsatisfactory means of investigation, concluded by noting that there were obviously a long list of interesting questions which he was obliged to pass by,—such as how to deal with sky-lights, how to apply the results of measurement to exceptional cases, how and when to

introduce considerations of aspect, how to recognize various standards of use and occupation, with many legal and administrative details of much importance to the architect,—to whom he would repeat, (this being in his opinion the best amendment of the law,) all this class of disputes should be referred, and whose investigations only needed the introduction of the principle of scientific proof to become in respect of intelligence and practical fairness, everything that could be desired by the public.

SUPPLEMENT.—EXPLANATION OF THE ENGRAVING.

These diagrams exhibit the mode of applying the system of measurement described in the lecture. No. 1, the *Plan*, is a common block plan of the premises in question, with the lines of lateral "projection" drawn thereon. No. 2, the *Section*, is the diagram by which the vertical projection is effected. No. 3, the *Square Projection*, is the resulting diagram of the case as projected upon one of the two forms; and No. 4, the *Circular Projection*, is the same upon the other form; in both cases the divisions being figured at their standard value, ready for the calculation to be proceeded with to a result.

Take the plan. The attention is first directed to the window; it is 3 feet wide, lighting a room 10 feet by 12. Old buildings as represented have originally surrounded it, of the respective heights marked; for instance, "old 30" signifies that the old building was 30 feet high from the datum level. The intended alterations are indicated by the lines marked "new" with the heights in feet as in the case of the old. A semicircle drawn round the centre of the window is divided into eight equal parts to correspond with the lateral divisions of the ultimate diagram, No. 3 or No. 4, whichever may be preferred. It becomes thus very easy to assign to any point on the plan its position laterally in the "projection," by taking a line from that point to the centre, and noting where it cuts the semicircle. Thus we arrive at all the upright lines of the diagram No. 3 and the corresponding converging lines of No. 4.

The section meanwhile comes into requisition to determine the heights and horizontal lines. The drawing is of the same scale as the plan; the circle as before is drawn round the same centre of the window; and the same divisions are set out to correspond with the vertical divisions of the forms No. 3 and 4. It is thus easy enough to determine the position of any point of plan vertically, by setting up the figured height thereof by scale at the proper distance (measured exactly from the plan), and noting the point this takes with reference to the divisions of the upright circle. (Observe the small crosses on the diagram.) This completes the peculiar perspective represented on the diagrams No. 3 and 4; the old buildings being drawn in full lines, and the new dotted. The circumstance that horizontal lines become curved need be no matter of difficulty; and with the help of the letters which mark the prominent points, the whole process of projection can be readily traced. (A few chimneys, by the bye, are introduced without being shown on the plan.)

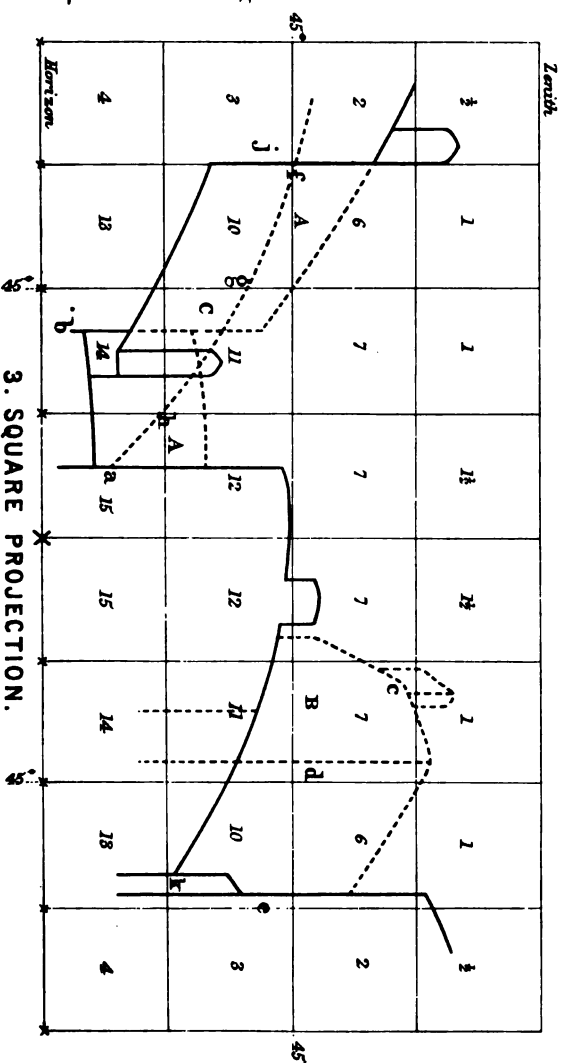
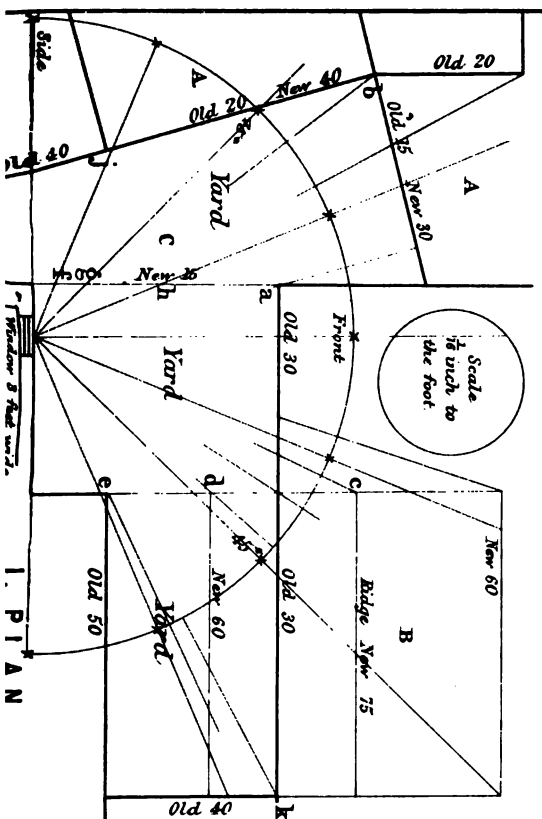
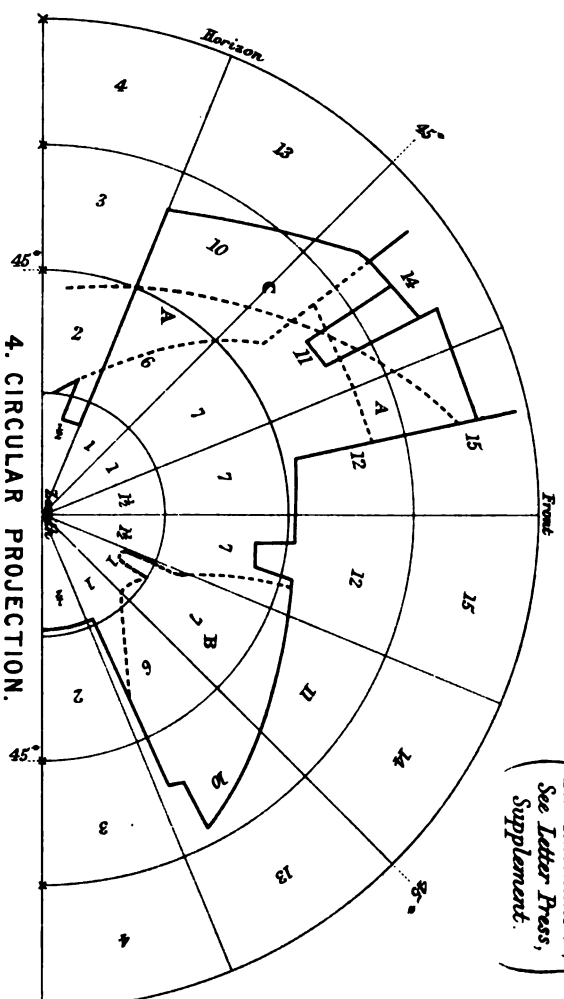
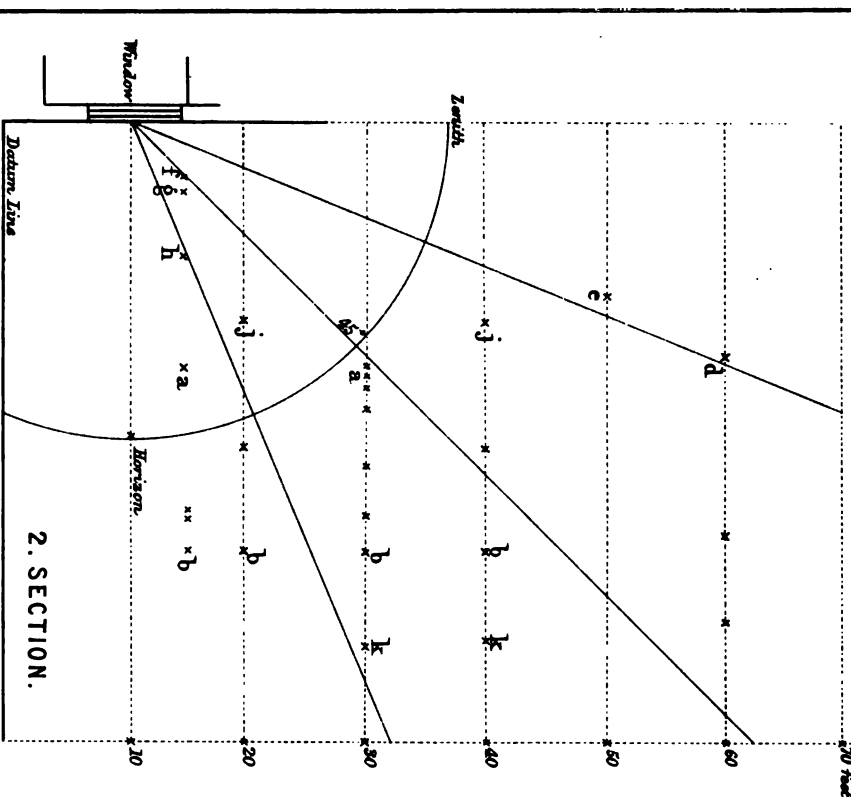
The difference between the two forms of "projection," Nos. 3 and 4, has been described in the lecture; the square model is perhaps most readily applied, while the circular gives a casual observer the best idea of the facts. No. 4 is in fact a sort of perspective drawing of the case on a horizontal picture-plane,—that is, looking up to the zenith; and No. 3 is a perspective drawing of the same on a vertical picture-plane, looking forward all around, but subject to the well-known disadvantages of an excessive range of subject.

Turning now to the final calculations, let it be observed that the intended new buildings are three; namely, A A, old premises on the left of the window, to be increased in height, one portion from 20 to 40 feet, and another from 15 to 30 feet; B, new premises on the right of the window, to be built somewhat nearer than the old and of increased height also; and C, a one story building to cover

THE MEASUREMENT OF OBSTRUCTIONS OF WINDOW LIGHTING.

BY PROFESSOR KERR, FELLOW.

(For Calculations,
See Letter Press,
Supplement.)



the yard between the window and A, and to be of the height of 15 feet. The calculation then proceeds thus, following the order of the figured divisions throughout, and estimating in each square the part which is unobscured, in proportion to the whole value of the square.

(LIGHTING) OR SKY-SURFACE FORMERLY POSSESSED BY THE WINDOW.

$\frac{1}{2}$	+	1	+	1	+	$1\frac{1}{2}$	+	$1\frac{1}{2}$	+	1	+	1	+	$\frac{1}{2}$	=	$7\frac{1}{2}$
0	+	6	+	7	+	7	+	6	+	7	+	$5\frac{1}{2}$	+	0	=	$38\frac{1}{2}$
0	+	8	+	10	+	$5\frac{1}{2}$	+	1	+	4	+	6	+	0	=	$34\frac{1}{2}$
0	+	0	+	4	+	4	+	0	+	0	+	0	+	0	=	8
															Total	$88\frac{1}{2}$ Measures.

ABSTRACTED BY A A.

.
.		$2\frac{1}{2}$	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.		8	+	5	+	2	.	.	.	.	.	.	.	.	.	.
.
															Total	$17\frac{1}{2}$ Measures, (=20 per cent. of the $88\frac{1}{2}$.)

ABSTRACTED BY B.

.	.	.	.	.	.	$\frac{1}{2}$	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	$\frac{1}{2}$	+	7	+	4	.	.	.	.	.	.
.	.	.	.	.	.	$\frac{1}{2}$	+	4	+	6	.	.	.	.	.	.
															Total	$22\frac{1}{2}$ Measures (=25 per cent. of the $88\frac{1}{2}$.)

(The further abstraction by C may be easily disposed of. We see that the new limit, although, taken by itself, it encroaches considerably upon the former sky-surface, yet, taken in conjunction with the encroachment of A A, does not reach the new limit of the latter, except at one point, and there very inconsiderably.)

Now to ascertain the effect of the above abstractions upon the *necessary lighting* of the easement. The floor space of the room lighted is 10 feet by 12, = 120 feet. By our standard this would require, with 68 measures of lighting, $\frac{120}{68} = 2\frac{1}{2}$ feet of window width. But the actual window width is 3 feet, which would obviously require $68 \times 2\frac{1}{2} \div 3 = 54\frac{1}{2}$ measures of lighting; this therefore becomes the minimum of necessary lighting for the occasion,—so that the $88\frac{1}{2}$ measures formerly possessed is enough and to spare: it was not all *used to the benefit* of the room. The exact amount of superfluity is $88\frac{1}{2} - 54\frac{1}{2} = 34$ measures, which amount the neighbour seems to be at liberty to abstract. The encroachment A A therefore, amounting only to 17, does no legal damage by itself. The encroachment B, being only $22\frac{1}{2}$ measures by itself, does no legal damage. But A A and B together, $17\frac{1}{2} + 22\frac{1}{2} = 39\frac{1}{2}$, would diminish the necessary lighting by $39\frac{1}{2} - 34 = 5\frac{1}{2}$ measures, equal to about 6 per cent. of the original $88\frac{1}{2}$. Would this, then, be a "material" damage? I think not. My rule has been that I would not support any claim based upon less than 10 per cent. R. K.

Professor DONALDSON said it was impossible adequately to discuss the paper this evening; he, therefore, proposed that the discussion be deferred. At the same time, they would not defer the vote of thanks to Mr. Kerr, who had treated the subject in such an able manner. Mr. C. C. NELSON having seconded the motion; the PRESIDENT said they were extremely obliged to Professor Kerr for his practical and valuable lecture. The vote of thanks was unanimously carried, and the meeting adjourned.

THE CONVENTUAL ARRANGEMENT OF BATTLE ABBEY,

BY MACKENZIE E. C. WALCOTT, B.D., F.R.S.L., F.S.A., Præcentor and Prebendary of
Chichester Cathedral.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, May 21st, 1866.

THE important Abbey of St. Martin's, Battle, at once one of the greatest historical monuments of this country, and also among the chiefest of the Benedictine monasteries of England, has hitherto never received that attention which it demands. It commemorates the signal victory of William I., and was erected, as All Souls' College, Oxford, was, by Archbishop Chichele as a magnificent chantry, in which masses were offered for the souls of those who had fallen in battle. The monastery is also the first purely Norman foundation which survives to our times. It is a simple act of respect to the Royal Institute of British Architects to preface my observations with the opinions held by previous writers, from whom I regret that I must wholly differ. The Duke of Cleveland gave me unlimited access to the various portions now remaining, and I propose to offer to the Institute the result of patient investigation, continued throughout a fortnight, to their consideration, supplemented by researches among all the documents and MSS. which are now available for the elucidation of the conventual remains.

GOUGH I. 204 (*Camden's Britannia*, 1789), says that "eight arches of the cloister and infirmary remain. The foundations of the high altar were not long since removed. The rest is stables, supporting a granary, once a dormitory."

THE MONASTICON (III.) repeats Gough, with a difference, mentioning the latter building twice over as the refectory.

GROSE, who certainly visited the place, and HORACE WALPOLE, in his gossiping way (in 1752), call it the church.

PENNANT, p. 42 (*Journey from London to the Isle of Wight*), speaks of it as "having in the middle vaulted rooms," and then mentions them over again as "several great vaults below."

BROWNE WILLIS was the first author who called it the refectory, and the topographer ROUSE says the "southernmost vault was the kitchen, and some say the library." In spite of Gough's shrewd guess this building has always since the time of Browne Willis been designated the refectory, and even in the latest archæological publication of last year. It is the key of the position, and on the determination of its true character turns the whole arrangement of the monastic quadrangle. I shall not, therefore, apologize for giving in detail the most recent account of all the remains, reserving my own observations in reply.

"Opposite to the gateway is a range of low parallel walls; the space between these walls was originally a range of chambers occupied by the monks as *sleeping apartments*. At right angles to this and fronting the south is the part of the abbey now used as a dwelling house, and the only part of it not in ruins. This consists of the *entrance hall*, a lofty and spacious room. To the left of this hall is a large room having a double vaulted roof, supported by a range of three round centre pillars. Judging from present appearances, and the position of this room with reference to the situation of the Abbey church, these aisles were, it is not unreasonable to suppose, a *part of the cloisters* of this church. On the north side of this range of the Abbey buildings are nine elegant arches, now filled up, but which appear to have been a *continuation of those cloisters*. All that now remains of the church are the walls and piers of a *crypt* at the east end of it, in which were three chapels, the piscina and niches of which

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are still well preserved. The walls of the *high altar*, which stood on the spot where the ill-fated Harold fell, are still open. Eastward of this part of the Abbey is its noble *refectory*. Under this room is a *crypt*. This room was not their usual dining hall, as is plainly shown by the appropriation of another room to this purpose, now the entrance hall of the present house, but which was then called the dining hall. The refectory was probably their state dining apartment, and used only on festal day. The arched doorway in the side walls of the *crypt* is supposed to have been the means of communication between it and the kitchen. The *refectory* was approached by a flight of steps. The foundations of the *chapter house*, which stood to the south of the church and to the east of the cloisters, are all that are now to be traced of this important part of the Abbey buildings."

I regret to say that my own deductions are opposed to all those statements, which are really merely a tradition of error, owing to want of due precaution in the later copyist, and I proceed to give the grounds upon which I have formed them. The earliest abbots came from Marmoutier and St. Stephen's, Caen; the plans of their abbeys exist in the *Monasticon of France*, and some of the first English inmates were brought from Canterbury and Westminster. We might well presume that there would be a general similarity between the plans of Battle and their monasteries, and such is the case; the dormitory is a very long building, on the *east side of the cloister*, running north and south, which appears to have been its normal position in all Benedictine houses, although we have a very few exceptions, as at Durham and Worcester. It was an invariable monastic rule to build the refectory on the side parallel with the minster, that is, invariably on the north or south, according to the relative position of the church and cloister. The Benedictine rule was to build the refectory east and west, just as the ordinary Cistercian practice was to set it north and south. We have thus determined three sides of the cloister, the refectory on the south, the minster on the north, and the dormitory on the east. The west side was occupied usually by cellage with upper apartments as here. We have now cleared the ground for a more particular survey, which I would preface by the documentary history of the monastery, which I regret to say comes no later down than the latter half of the twelfth century.

The Dedication of the Minster to the Holy Trinity, St. Mary, and St. Martin, was made Feb. 11, 1095 (Chron. p. 41), by the Primate, in the presence of the king, six bishops, and many nobles and laymen.

St. Martin's altar is mentioned, 1076, and the building is urged forward (p. 9).

The Cloister was rebuilt before 1171, by Abbot Walter, with marble shafts, and a lavatory designed.

The Nave was partly leaded, 1125-35, by Abbot Warner, *restauracionis ecclesie indies proficiente statu* (p. 62).

Ecclesia, i.e. the Nave, was partly leaded by Abbot Ralph before 1125 (p. 58).

The Altar of the Holy Cross and Rood are mentioned 1171 and 1095.

The necessary Offices (*sedificia officinarum necessaria*) were built after the Church by Abbot Gausbert, C. 1095, and there was nothing remarkable or fine in them, p. 43.

The Chapter House is mentioned, 1102, Abbot Henry being buried in it, p. 47.

Precinct Wall built by Custos Gausfrid and Abbot Ralph, 1100-25 (Chron. p. 49 (Gausfrid), *murorum circa ambitum fundationi animum contulit*; the abbot built *residuam murorum in girum*), p. 58.

The Court was enlarged and received additional buildings before 1125, "*Curie spatium dilatare, novis eandem fabricis augere*" (Ib. p. 58). Abbot Odo was buried in the lower part of the nave in 1200 (Leland, Coll. IV. p. 68).

The Parish Church was built before 1125 (Chron. p. 56).—Bp. Anian's indulgence, for completing it is dated 1270 (MS. Brit. Mus.). On June 9, 1380, Edward III. gave his royal licence to *renewallate* the abbey.

The dimensions of the various buildings are as follows :—

Nave	180·		Gong	100·	21·7
Transept		35	Guest House	195·	40·9
Choir	107·	62· (32· aisle 15·)	Day Room	59·3	35·4
Lady Chapel Crypt	44·	79·5	Slype	6·8	35·
Cloisters, N.S.	122·	E.W. 109·7	Parlour	22·7	35·
Refectory	115·?	39·5	Calefactory	60·	35·
Dormitory	154·	35·			

I shall now treat the buildings in detail.

The Conventual Remains. Immediately after the dissolution, the church, bell tower, cloister, chapter house, and sacristy, were destroyed, and the superstructure of the cellarage, probably the dormitory of the lay brothers, was rebuilt by Sir Anthony Browne and his son, in 1539. The walls of the precinct with large buttresses, and portions both of Norman and Decorated date, remain upon the north side of the Abbey, reaching from below the parish church to the grand *court gate*, with its noble great archway and postern; the former has bosses representing foliage, and on the south carved heads of Edward III. and Philippa. It forms a tower 35 feet square and 54 feet high, with octagonal turrets, battlemented above a string course, and is 62 feet high. The basement is vaulted; in the south west turret is a staircase to a chamber in the first story, across which and the turrets is a rich arcade, pierced with two cinquefoiled lights. In the upper stage the turrets have cruciform loops, and the main building has a two-light window with tracery in the head, flanked by canopied trefoil-headed niches. At the west end are a Norman window and buttress and some masonry of the same period. A wall formerly communicated with the guest house. Near it are remains of the Pilgrim's Hospital.

On passing under the gateway we find it forming the north side of a large court; on the east is the *Abbot's Lodge*, and to the south the terrace of the *Guest House*, with large octagonal and battlemented turrets in the western front. It stands over a superb range of early English cellarage, divided by strong walls into eight partitions. It measures 195 feet by 45 feet. At the east end is a large angle fireplace, with the chimney slope above it. On the north side was a passage communicating with the abbot's lodge, 75 feet long. The superstructure, after the dissolution, was converted into apartments which were never internally finished. At the north end was the grand staircase; adjoining it was a noble guard room, 46 feet by 22 feet, succeeded by an ante-room, leading to a gallery, 162 feet long, with windows to the south. At the east end of this gallery was a drawing room, thirty-one feet by twenty-nine, having three windows to the south; and on the north side were several rooms having windows to the court.

The Abbot's Lodge contains his hall, 57 feet by 31 feet, and 57 feet high, battlemented and having large buttresses; it is lighted by three large west windows, and one on the south, rebuilt with the oak ceiling in 1812. It contains a dais and music gallery. It is approached by a porch vaulted in two spans, with a western door of Perpendicular character having corbel heads to the hood mould. The whole of the front has been reconstructed since Grimm made his drawings in 1783, and crow-stepped gables have been added to the hall. Northward of this porch is the substructure of the abbot's solar, 50 feet by 22 feet, vaulted, and divided into two alleys by three pillars of Decorated date, the arms of Edward III. appearing on the brackets. Above it was his solar, marked by a crow-stepped gable, and reached by a stair turret, still remaining. The substructure is now the drawing room, and has been richly coloured and gilded in good taste by the Duke of Cleveland. On the north-west angle is an octagonal turret with stairs. A battlemented wall runs northward from it to the jambs of a great gateway, which opened into the Minster court; and another wall, connected with the Abbot's chapel and in a direct line with the south wall of the church, still retains a large pointed archway on the south side. Walls originally ran northward from this point to the east side of the court gateway. The

eastern gable of the chapel, with a circle over three lancets, which stood over the north end of the cellarge, is represented in one of Grimm's drawings: the staircase, near a pillar with beautiful foliage, remains; and at the south end of the cellarge are stone stairs which led to the upper storey; beyond them is a doorway with a shouldered arch and chamfered jambs.

The great Cloister Garth forms a square of 120 feet by 109 feet. On the west side is an arcade, upon a wall which formed the western side of the west alley of the cloisters, which was vaulted, the Early English springers and shafts still remaining. The arcade of nine bays has in the two southernmost panels beautiful groups of foliage in the tympanum of the arches, of transitional Early English date, the capital of opening roses is of peculiar beauty, crowning the shaft which divides the sub-arches in one of the bays; the rest are of the Perpendicular period, with blind tracery of four lights in each bay, there is a door to the cellarge at the north end, and near it what may have been a turn for giving an extra cup of wine to a weary monk.

The richly arcaded basement of the west wall of the Refectory, two niches for plate or lights, one trefoil headed, the other imperfect, with the side of a window above them in a fragment of the south wall remain. The Decorated arcade is cinquefoiled, with trefoiled spandrils and a rich cornice. Its width was about 40 feet. In 1783, the basement of the north and south walls was standing. At the termination of the west wing of the cloister is a wall containing a newel staircase, and in front of the Abbot's parlour, now the dining room, is a projecting wall, with a passage hitherto designated the Abbot's oratory. On the west side are remains of a window. The string course has carved corble heads. The Kitchen, which was vaulted and polygonal, stood southward of the Hall. Stairs still communicate with large vaulted passages running parallel with the Refectory. In the south-east angle of the cloister may be seen the bases of Early English shafts, which formed one side of a doorway; and northward of it are the bases of two other shafts on the east wall of the cloister which was vaulted over. Adjoining this portion of the ruin, and between the transept of the Minster (or possibly, as was the ordinary arrangement, the *slype* or passage to the cemetery of the monks on the south side of the choir), and the Dormitory, stood the Chapter-house, the foundations of which were discovered in 1817 northward of the avenue of elm trees.

The Dormitory, 154 feet by 35 feet, Early English, presents a range of eight windows on the west, with a smaller one at the south end, and on the north a window and niche. There are ten windows on the east, with a doorway to stairs descending through a buttress; and another at the south-east angle, which communicated with the Gong, which ran eastward at right angles to the dormitory; some parts of its southern wall with two large arches remains. Each window of the dormitory has nook shafts, and was transomed in order to afford a smaller light for the accommodation of the cells of the monks, who occupied them at night and during the meridian, the midday sleep of one hour; each was divided from the central passage by a low parclose, and contained a bed and seat. In the south elevation are three lancets above, and two below them; the gable contains a single light. In 1811 the tiles of the floor were discovered. The roof was of Sussex oak, and shingled; part of it remained at that date. The walls were painted below, and in imitation of masonry above, in red colour. Below the dormitory are three chambers, with Purbeck shafts and vaulted. The northernmost, the Day-room, 55 feet by 35 feet, is in three alleys, divided by eight pillars, vaulted, and lighted by broad windows, and entered by a door in the south wall of a *slype*. It formed the ordinary sitting room of the monks when not in cloister, hall, or dormitory. The Regular Parlour on the south side of this *slype* is vaulted, and lighted by two lancets in the east and west, and forms two alleys divided longitudinally by two pillars. In it conversation was allowed at certain times. To the south is the Calefactory of four bays with three pillars, 58 feet by 35 feet, and 23 feet high; it retains traces of colour on the plaster of the vault, a large fireplace from which it derived its name, two deeply splayed windows on the south, a good south-west two-

light window with a quatrefoil in the head; and in the west wall a lancet, and doorway with steps ascending outward. This room would be used by the monks to warm themselves, to light censers and dry parchment, and, perhaps, by the writers. In the south-east angle is a staircase to the gong. The south-east part of the exterior walls shows two large round headed arches, and the outer doorways of the two staircases to the upper and lower gongs or garderobes. In a map, dated 1722, there were eight arches remaining at the south-east end of the latter buildings. The stairs in the dormitory wall probably were used by the *minuti*, or monks, who had been bled, and returned from the infirmary at night. The walls of the infirmary may still be traced eastward of the dormitory, as it stood at Winchester, Westminster, Canterbury, Peterborough, Crowland, Ely, and other places.

The Abbey Church of St. Martin. The Abbey Seals represent the western front, with a large gable containing round windows and a niche; above a magnificent arch, like that of Tewkesbury, or more probably as at Marmantier, it was a rough representation of three large portals, such as may be seen at Lincoln or Peterborough. The central tower, which is crowned with a low spire, is of two storeys, with round windows under circles, and windows in the upper stage. The transept has a clerestory, and is terminated on each front like the choir by an arcaded tower higher than those of St. Stephen's, Caen, or Peterborough, and crowned with a low spirelet. The arrangement of the apse with three radiating chapels resembled that of Bury St. Edmund's, Norwich Cathedral, and the original plan of Gloucester, Pershore, and Worcester. On the seal of Abbot Odo, which appears to give a lateral view of the church, there are three eastern chapels, which tally with the existing eastern front. Vertue, in 1784, gave a ground plan in Rapin's History, which represents a cruciform church with a triapsidal eastern end. Gough mentions two western towers, but evidently in error; on the north side in the plantation there are foundations covered with trees, and doubtless there was also a north porch for the entrance of lay visitors and women into the nave. The fragment of the south west angle which remains, 6 feet thick and projecting nearly 4 feet, exhibits nook shafts; the interior of the Perpendicular south doorway of the nave, opening into the west alley of the cloister, is concealed by a modern building, but the lower part of the jambs are perfect, as well as the bases of the shafts on the outer or southern side. The basement of the south wall of the nave remains. Above, in the south west angle may be seen the side and half the arch of a round headed window which lighted the nave; possibly, from its height, the aisle roof, as at Rochester, was raised to the level of the nave triforium. Midway in its length is a stone grave, possibly the tomb of Abbot Odo, who died in 1200, and was buried, as Leland says, in the lower part of the nave, which measured about 130 feet in length, and was probably 60 feet in width. The transept and choir have wholly disappeared, the former was about 35 feet wide. In the north wing was the Altar of the Holy Apostles. The rood loft, surmounted by a large crucifix, with the Altar of the Holy Cross, stood at the entrance of the crossing. In 1445 Sir Thomas Hoo founded a chantry at "St. Benignus' altar." From the platform of the processional path, which terminated in a square end behind the high altar, standing on the spot where Harold's standard fell, stairs leading out of the aisles of the presbytery and once enclosed with circular buttresses (possibly forming turrets above, to flank the east gables of the aisle), communicate with a crypt, which consists of a transverse alley opening into three pentagonal apses of Early Decorated date, each of which has its altar. The eastern one in part remains, and was situated under the upper Lady Chapel; in the north chapel the caps of the vaulting shafts and a drain; and in the south chapel a trefoil headed niche with a drain are still to be seen. The vaulting is gone. The crypt is 44 feet 6 inches in length by 79 feet in breadth, and the diameter of each chapel is 21 feet. Crypts were discontinued after the Norman period, but there is an Early English example at Hereford Cathedral under the Lady Chapel; another of the Decorated period under the choir of Wimborne Minster, and a third of Perpendicular date under the western Lady Chapel of Glastonbury Abbey. This crypt was not an addition, but a reconstruction of an earlier apsidal termination, in the last

part of the thirteenth century. The eastern arm, from the crossing to the end of the processional path, measured 107 feet, and including the eastern chapel of the crypt was 142 feet in length. The central alley was 37 feet broad internally, and each aisle about 14 feet. A curious tradition, preserved in the *Eulogium Historiarum*, gives us the actual dimensions of the church. According to the legend William I., after three days of fast and prayer, desired of God to know the duration of his dynasty in England, and was directed to lay out the plot of a church of as many feet as they should reign years. The next morning with stakes he marked out ground to a length of 500 feet, these boundaries three times were removed and fixed to 315 feet, which were recognised by him as the exact dimensions of the Minster which he built. It therefore exceeded the length of Rochester, Bath, Sherborne, Christchurch, Hants, Southwell, Ripon, Manchester, and Romsey. Outside the south-east angle of the south chapel is a large circle or polygon, 50 feet in diameter, marking the site of the bell tower which stood in a position almost corresponding to those at Worcester and Croyland. The crypt was first laid open in 1817. Eastward of these remains, among the cedar trees, may be traced the walls of some buildings of the Base court. The water was supplied from Feldresland and Loose Farm.

The Precinct wall is partly the original Norman enclosure, and in part of the date 1380; it retains considerable portions of the alura, and extends from the Court Gate along the road known from an early date as Santlache. The Church of St. Mary contains some brasses, stained glass, and a rood-stair and bridge. The Nave, with its round and octagonal pillars, is Norman; the Clerestory and chancel, which is arcaded like Rochester, Brecon, and Merton, are Early English. The north aisle is Perpendicular, with the Lady Chapel at the east end. The Chapel of St. Katharine and the south aisle windows are Decorated; the former retains some canopied niches. The font is Transitional Norman; the tower Perpendicular, with the original Early English western doorway.*

In reply to inquiries by Mr. STREET and Mr. W. PAPWORTH, Mr. WALCOTT explained that his ground plan was only in part conjectural, portions of the church still standing, and others being indicated on the turf in hot weather, and by irregularities of the ground. Comparison with plans of the period facilitated such investigations. No excavations, unfortunately, are possible without the destruction of ornamental gardens and plantations, which would hardly be tolerated. The crypt he considered to be Early Decorated, of the close of the thirteenth century, and rather a reconstruction of earlier work than a positive addition to the east end, for the purpose of interment of abbots and persons of distinction. The earlier arrangement of the eastern end of the Minster, at latest in the twelfth century, is shown upon the conventual seal of that date in the British Museum, apparently a rude representation of three Chapels. There are many instances of three eastern chapels, as at Bury St. Edmunds, Pershore, Gloucester, Tewkesbury, and Norwich originally; here exceptionally they form a conjunctive group. The Pentagonal form of the apses shows that they are not of Norman date.

At the request of Professor KERB, Mr. WALCOTT explained the ground plans of Ely and Peterborough, which he exhibited. But as these form part of Mr. Walcott's *Cathedral Cities of England and Wales*, now in course of publication, it would be superfluous to print them in this place.

A vote of thanks was carried by acclamation, and the meeting adjourned.

* A succinct history of the Abbey, drawn up from my own investigations and original documents, will shortly be published by Mr. Ticehurst, of Battle, with illustrations.

ADDITIONAL ILLUSTRATIONS OF THE CONVENTUAL ARRANGEMENTS OF BENEDICTINE ABBEYS.

By MACKENZIE E. C. WALCOTT, B.D., F.R.S.L., F.S.A., &c.

Appendix to Paper read at the Ordinary General Meeting of the Royal Institute of British Architects,
May 21st, 1866.

THE archæologist, in endeavouring to allot the various buildings of a monastery, in the case of Cistercian houses, has the Nomasticon to guide him, but for those of Benedictines he has had hitherto no more light than is afforded by Davies' 'Rites of Durham,' written in the sixteenth century, or the notes of Dr. Hopkins for Worcester; but I had the pleasure of shewing before the Royal Institute of British Architects some time since that Lanfranc's 'Constitutions,' by a special exception, perfectly illustrated the existing buildings of Canterbury, and I am now able to redeem the hope, which I then suggested, of one day using the 'Customal of Westminster,' written after 1260, for a similar purpose. From it I shall select those portions which give positive information on the conventual arrangement, merely premising that it is a confused Mediæval MS., full of repetition and ill-arranged, but still enlightening us on a subject very intricate and in many particulars involved in obscurity. In fact throughout it we have contrasts between "ancient usage" and "modern use," and in one place the author doubts whether "the Long Chamber" adjoined the Refectory or was the Prior's Chamber; it is no wonder, therefore, if the archæologist now experiences difficulties which are too often insuperable, except by means of comparison with other known buildings of a religious order. The style of Latin employed may be judged from the derivation of Capitulum as *capud licium*, "the conclusion of strifes."

First in order I take the *Cloisters*. The south alley was usually left free and unoccupied, it being passable only at certain times; in the west alley, in cloister time, the Master of Novices, junior monks under his charge, and novices sat; in the north alley, the Prior near the east church door, and the monks according to seniority, juniors being nearest to him and sitting sideways, with the face of one turned to the back of the other. At the upper end of the east alley sat the Abbot. The bench-tables were covered with matting, and the floor was strewn with hay or rushes, according to the season. At night, before Matins and until their close, five cressets in lanterns were lighted by the Sub-chamberlain, one at the dormitory door and the rest at the four corners. Three other cressets, in hanging lanterns, after dark were lighted, one in the north alley in the middle towards the church door, a second in the west alley near the aumbry of the Master of the Novices, and a third in the south alley next the Refectory. They were extinguished by the Sub-chamberlain when the "Rounds" had passed after Compline. The Prior, Sub-prior and Master of Novices preserved order. The Keeper of the Cloister Aumbry for the books had his own seat. At the *Lavatory* there were five towels, two used by the Cloister Prior and High Mass Priest, and three on perches for the use of the Convent and guests, all being changed on Sundays by the Chamberlain's servant. After meridian the monks washed their hands and combed their heads, and between supper and Beveres. Cloister time was after Prime; and after Tierce conversation was allowed, but those in conversation remained sitting, and spoke in French; Latin was used to a Prior or Master of the Novices; English was forbidden. In the Carols (which were proscribed to the Cellarer, Infirmer and Chamberlain) illumination, writing, and noting

music, for the good of the church, were allowed. As lay people much frequented the cloisters, signs of punishment were not to be visible when they were passing. In the cloister shaving took place once a fortnight, and feet-washing every Saturday. The monks shaved in gangs of three; during these operations all the doors into the cloister were rigorously closed by the servant of the inner hostry, the servant of the outer parlour, the doorkeeper of the cellarage, and the church servant. The inner hostry and outer parlour were on the west side, as the cellarage was also, opposite to the chapter house door. There were also a *cella monachorum hospitum*, a monks' spital, and a small chapter house for the use of obedientiaries.

The Outer and Inner Parlours. The outer parlour was only opened after Chapter, or for the reception of guests, persons desiring admission to the noviciate, or monks returning from a journey. In the outer parlour a fugitive monk, who returned, bared himself for discipline in chapter. It was under the charge of the Almoner and Sub-almoner. It was opened for the entertainment of a matron or monk's mother, after hall time and before supper. It was strewn with hay or rushes and furnished with mats. The inner or regular parlour was similarly supplied; in it was a long large mat, on which monks who had been bled sat; and here conversation, under certain restrictions, was permitted. There were also cells for the refractory, and a prison with low diet for the contumacious.

The Refectory. At the upper end was the high table, elevated on a step; at the north end sat the Abbot, with a *skylla* or bell on his right hand; at the south end the Prior sat. A Bishop, if present, sat in the middle under the "Majesty." Before the president was laid a great cup, knives and spoons, napkins for bread and cheese, silver salts, cups, bason, towel and ewer, and a wooden dish for the alms or fragments. At the lower end of the hall was the table of the *Minuti*, Monks who had been bled; each table was raised on a step, and the benches were matted; there was space sufficient to pass between the inner benches and the walls. Each monk had his own knife, and a smaller *cnipulus*, salts were laid out, and cups and spoons; two servitors attended at high table, and one on either side of the hall; with the reader they had "*mixtum*," a slight meal before the *cymbalum* sounded for dinner. Four guests were invited daily by the president, and five by the convent. No guests in boots or spurs were admissible. The president sat with them after hall; or, under particular circumstances, to hostry, the Long Chamber, or St. Dunstan's Chapel, (possibly that known as the chapel of the *Pyx*), for wine and dessert. But if a simple monk was president the additional fare was taken in silence behind the Refectory door. Mothers of monks were entertained in hall. The Refectory had a large *aumbry* for cups. Between the Refectory and the kitchen, at the south or south-west end, was a vaulted passage, and in the kitchen window a towel was hung. The dinner hour varied, being at 12 or 3 p.m. Two lamps burned at supper time. On festivals of St. Edward C. the nave was filled with 34 lamps, 13 tapers and 100 candles, and then 18 or 22 tapers were lighted, three on each of the four principal tables, and two on the rest. The hall was closed after Compline.

The Misericord adjoined the Refectory and kitchen; in it the monks dined on flesh days. It had its allowance of candles and tapers, and was strewn like the Refectory.

The Dormitory. On the third step, at the top of the stairs was a crucifix in the window. Each monk had a straw bed, with coverlet and under covering, with a bench for dressing at the foot, a round mat at the side, a perch an ell long over his head for his clothes, and an *asser* or partition, a palm high, to secure seclusion from his fellows. All slept in night clothes and caps. Snorers and talkers in their sleep were placed by themselves. No coverlet was to be scarlet, green, or of bright colours. The central alley was covered with soft mats, and the floor strewn on ten principal feasts with rushes or mats. There were several bells, one in the parlour, a *skylla* in the Dormitory, another in the Refectory, and a *cymbalum* rung at Hall time in the cloister. At night the Prior with a lantern visited the

Dormitory, and the Gong or Latrine (*domus necessaria*) with its *sedilia*, which were furnished with hay. The monks went altogether into the Gong in the morning, and last thing at night. In the middle of the night the third and fourth Priors made the rounds.

The Infirmary contained chambers. In the Chapel of St. Katherine certain punishments were inflicted. A lamp burned at the entrance of the cloister to the Infirmary. The monks walked along the bank of the Thames, and some of the obedientiaries were allowed to go into the Palace or London. Upon the Thames was the Abbey Mill, near a wharf where the corn and fish brought from London in a boat were landed. We find mention of the Hostillar's mead, and the Abbot's mead.

In the Almonry the old clothes and fragments were distributed to the poor in the Dolehouse.

In the Tailory was the bath house. There was a chamber (*domus*) for the writers.

The Chapter House contained a lectern for the martyrology, pulpit for collation and sermon, and crucifix. Before the President's seat was a step where the *Venia* was made. The lowest place was near the door. The ordinary monks sat in order of their admission. In it corporal punishment was inflicted, novices were admitted, penance adjudged, and conventual councils held and charges made. Over the Chapter House door was an image of the Virgin, and facing it a delinquent monk sat in cloister time reading the Psalms.

The Church. On the south side sat the Abbot, Prior of cloister, the third Prior and Præcentor; and on the north side the Prior, the Sub-Prior, fourth Prior and Succentor. The choir contained a high altar and choir altar, stalls for the monks, forms for novices, and a bench or *trunculum* for defaulters in the centre. A *Reclusorium nostri fratris* is mentioned. This cell was probably situated in the choir aisle. Mats were laid on the benches and in the stalls, and before the altars; rushes and hay were strewn in the Presbytery, and in the choir ivy leaves and sea rushes. A lantern was carried through the choir at *voctums* to detect sleepers. The church bells were rung by the four church servants or the brethren of the guild. Three tapers burned perpetually before the high altar, and five others in silver basons in the Chapel of St. Edward; two in the middle and two over the tombs of Queen Matilda and Queen Edgitha; on great festivals five lamps were also burning at certain times at the Holy Cross altar, at St. Paul's altar, (where the people came up on one side and descended on the other to kiss the feet of the crucifix), at the Old Lady altar, at the Trinity altar, and at St. Benedict's altar. Lights burned at the antiphonar desk, on the west side of the choir door and in the watchers' chamber, and on great days a seven-light chandelier. The coronation robe of St. Edward was also exhibited at times. In the Lady Chapel on the feasts of assumption and purification 20 tapers were lighted on the beam before the altar, 50 round the altar, and tapers in angels' hands.

. I should mention that there were three round apses at the east end of St. Martin-le-Grand, at Dover, the foundation of which was almost contemporaneous with Battle.

ON THE PRACTISE OF ARCHITECTS AND THE LAW OF THE LAND IN RESPECT TO EASEMENTS OF LIGHT AND AIR.

By PROFESSOR DONALDSON, Ex-President.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, May 28th, 1866.

IN presuming to suggest, at the meeting when Mr. Kerr read his very important paper on the subject of Ancient Rights of Light and Air, that the discussion on the subject should be deferred to another evening, as it was then too late to enter upon its consideration so fully as it deserved, I had no idea of opening the discussion myself; but as our Honorary Secretaries requested me to do so, I felt myself compelled to yield to their wish. Not that I think myself at all competent adequately to grapple with so complex a subject, but as there are many recent decisions, which have strictly and accurately laid down the law, hitherto supposed to be vague and apparently undefined, and as this interpretation of the rights of owners appears to me, as it does to Professor Kerr, to trench arbitrarily by its empirical dictum, and seemingly at variance with natural rights, and to interfere with the improvement and necessary enlargement of property in cities,—I venture to submit to your consideration a few very important observations on the matter. It is to be hoped that some legal mind will take up the subject, and produce a reliable work embodying accurately and fully the law as it is, and suggest some remedies for the wrongs it inflicts. It is not unbecoming for architects to endeavour to unravel these mysteries, as it is upon their statements of facts and opinions as to probable results, that action is taken, and as their own designs for buildings in towns must conform to the limited terms of the law. But I must observe, also, that the judges are apt not to place that reliance upon professional evidence to which we may consider it entitled, from the spirit of one-sided advocacy from which it too often proceeds, and the necessarily contradictory statements made; and I think that our friend Professor Kerr must invent some more simple diagrams and illustrations of his theory, ere he will induce a judge or jury to make themselves acquainted with his ingenious but elaborate series of lines, the very sight of which is apt to bewilder the previously uninitiated.

This Light and Air question,—one of great importance, as involving serious consequences to owners and occupiers of property—divides itself into two clear and distinct divisions: The rights of the owner—The rights of the neighbour. It might be supposed that the natural right of the owner of the soil would be absolute,—“*ab imo usque ad cœlum*,” but this enjoyment is limited by the legal restriction, necessarily artificial, as to the extent to which such right shall not diminish the enjoyment to which the neighbour is entitled. But there are intrinsic and extrinsic rights which may apply to a plot. It would appear a natural conclusion, that whatever may be the extent of the enjoyments of an owner in respect of light and air, they should arise from or be provided on his own plot; but there are usually public rights attached thereto, which afford him certain easements, as, for instance, when the plot abuts on a public way, which thus affords him access, light and air, on that side. And there are also rights derived from the neighbouring land, which by law belong to him from prescriptive right, that is, not a mere natural right, but a right from previous enjoyment for a certain period of time. This period has been fixed by law (2 & 3 Will. IV. c. 71) at twenty years, as follows:—

“Clause 3. And be it further enacted, that when the access and use of light to and for any dwelling house, workshop or other building shall have been actually enjoyed therewith for the full period of

twenty years without interruption, the right thereto shall be deemed absolute and indefeasible, any local usage or custom to the contrary notwithstanding, unless it shall appear that the same was enjoyed by some consent or agreement expressly made or given for that purpose by deed or writing."

As quoted by Lord Chancellor (*Yates v. Jack*, 1866), there was supposed to exist previously a local custom in the City of London, by which the owner of a house in any street was permitted to raise it to whatever height he might think fit.

It seems strange that the law should so disregard the inherent rights of an owner, that if a neighbour should cover his plot with a building, and derive all his easements of air and light from his neighbour's land, the law does not protect the neighbours from such an assumption, nor even by law to compel the abatement, but forces them to protect their rights by the expensive process of erections in front thereof—erections possibly useless and nuisances to themselves, and occupying space. Why should they not be able to protect their rights by proper notices, or by law be enabled, as, I believe, is the case in France, by a short process to compel the abatement of the trespass?

And another case may arise of the limitation of enjoyment of one's property. On one side of a street there may be a house, say 20 feet high, and on the opposite plot no building. The owner of this plot may not erect any building which may obstruct the light of the low building, which may be only 20 feet high, although if he were able to carry up on his own ground a building 50 or 60 feet high it would be immensely beneficial to him. But this right as to direct light applies even to an obstruction in a lateral direction, as the owner of an erection of twenty years' standing exercises as to light and air a lordship to the properties not only in front but to the right and left of him.

Vice-Chancellor Kindersley. MARTIN v. HEADON. 4th May, 1866.

Reported in the *Times*, May 7. Re Premises Conduit Place, London Street, Paddington. The question then here was the quantity of light obstructed, and it must be borne in mind that the actual amount of sky area lost was not only to be taken into account, but the space to which the plaintiff's right had already been reduced by the previous buildings. Looking at it in that point of view, although it was true that here the obstruction was oblique, an enormous amount of sky area was obstructed—more than half. The evidence established a serious and material injury, and it appeared clearly that the plaintiff was obliged to cease from using his cutting room in consequence, and that a previous occupant had left because the defendant's houses were built.

A defendant had not a right to say that, because a plaintiff could carry on his business elsewhere, he was not entitled to relief. He was entitled to be relieved against whatever interfered with his business of a tradesman, or his convenience and enjoyment if not. There must be a declaration that the plaintiff was entitled to damages, and the usual inquiry on the subject.

But let us suppose, that the neighbour or neighbours, from unwillingness to incur the wasteful expense of screen, or not at the moment aware of the extent to which the erection may have compromised his rights, should have allowed such trespass to the builder for twenty years, then the plenitude of right accrues to the builder, as if it were an injury to him,—who has already for twenty years by sufferance enjoyed all the advantages of the encroachment upon the adjoining rights,—not to have established his control over his neighbour's property. But the unrighteousness of the present state of the law becomes one-sided and more oppressive in regard to what may be called the inherent or primitive natural rights of property, when we consider the case of two plots opposite to each other, on either side of a street or public thoroughfare. The one has an erection, say 50 or 60 feet, his opposite neighbour one of 15 or 20 feet. The latter may not raise his building, as it may obscure the

light of the lower part of the building 50 or 60 feet high, because it was not convenient to him to carry up his 15 or 20 feet building to a greater height previously, and thus he is tied down to his dwarfish proportions in face of his gigantic opponent, and must so remain. Ought not the public way to confer at all events equal rights on the owners of buildings on both sides, and at least to allow of an erection to a like height on both sides. Or why should the dwarf on one side be able to stunt the growth of the aspiring erection on the other, and to keep it down to the like diminutive elevation of 15 or 20 feet, and not leave both free. Does not this become a public wrong, as reducing the value of property, the improvement of which is a public benefit.

Let us also imagine another case. A man has his building, A, say 40 or 50 feet high on a plot of ground, which building immediately abuts on a vacant plot, B, say 20 feet wide; but on the other side of the vacant plot is another plot, C, on which a man desires to erect a lofty building, say 40 or 50 feet high, which may intercept the light and air of the original building; why should he be restrained from exercising his morally just control over his own plot, when a stranger intervenes between the two?

Substantial damage must be done. The term "considerably obstructed" does not enable the Judge to form an opinion. The mere having to alter the position of a table to work at in order to see better, is not sufficient evidence.

Lord Justice Turner. Re CURRIER'S COMPANY v. CORBETT.

It is not every impediment to the access of light and air which will warrant the interference of this Court by way of injunction, or even entitle a party alleging himself to be injured to damages at law. In order to found a title to relief in equity or even at law in respect of such an impediment, some material or substantial injury must be established, and the onus of proving the injury must rest of course upon the plaintiff.

The Lord Chancellor in CLARKE v. CLARKE. Nov. 20, 25, 1865,

Stated—The Court will not restrain the erection of a building merely because it deprives an ancient window of some portion of light; but will do so, when the obstruction is such as to interfere with the ordinary occupations of life. A lateral obstruction may be such a nuisance to be restrained.

Such questions are questions of degree. Whether the obstruction be such as to deprive the complaining party of such a supply of light and air as he might reasonably calculate on enjoying.

Questions such as these cannot be treated as abstract ones, for much turns on the nature and locality of the windows.

The room might be rendered less cheerful during winter months, but the obstruction does not amount to a nuisance, as it is not shut out from the open sky and driven to depend upon reflected light.

The plaintiff is bound to show that such obstruction interfered with the ordinary occupation of life.

Far from saying that no obstruction can be such as to amount to a nuisance, unless opposite to the light obstructed: but in estimating the quantum of inconvenience the circumstance, that its effect can only be felt laterally, is then not to be overlooked.

The real question is not what is, scientifically estimated, the amount of light intercepted, but whether the light is so obstructed as to cause *material* inconvenience to the occupiers of the house in the *ordinary occupations* of life.

Lord Chancellor. YATES v. JACK. 1866. Jan. 16, 19, 21, 22, March 24.

The owner of ancient lights is entitled not only to sufficient light for the purpose of his then business, but to all the light which he had enjoyed previously to the interruption sought to be constrained.

Where an injunction was granted to restrain the interruption of an ancient light, the Court gave the Defendant leave to apply in order to ascertain whether any building, which he might propose to erect, would cause such an interruption.

The Defendants had pleaded that no material injury would be done to the Plaintiffs, and particularly that there would be ample light for the business carried on by them, and, in fact, that the screening off of the direct rays of the sun would be a positive advantage.

The Plaintiffs objected to limitation to their right of light and air to only so much as will enable them to carry on their present business, and also objected to the Defendant being allowed to adduce further evidence with reference to possible alterations to such an extent as not to interfere with the rights of Plaintiffs.

Lord Chancellor. Although for some purposes of a trade it is necessary to exclude the direct rays of the sun,—yet it is comparatively an easy thing to shade off too powerful a glare, but no adequate substitute can be found for a deficient supply of daylight.

The right conferred by the 2nd and 3rd Will. IV, c. 71, is an absolute indefeasible right to the enjoyment of the light without reference to the purposes for which it has been used.

The Defendant had not established his defence unless he had shown that for whatever purpose the Plaintiffs might wish to employ the light there would be no material interference with it.

House of Lords. *TAPLING v. JONES*. 16th March, 1865.

Lord Chancellors Cranworth and Chelmsford.

A house, 107, Wood Street, Cheapside, City of London, originally consisted of three storeys, with one window in each story. The owner A altered in July and August, 1857, the windows in the two lower storeys, but so as to make them both to occupy part of the old apertures, and retained the window in the third story unaltered; and he built two additional storeys, in each of which he put a new window. After these alterations were completed, B built up a wall opposite on the adjoining land in Gresham Street West, and completed it by end of October, 1857, to such a height as to obscure the whole of the lights of A's building. It was impossible for B to obstruct the upper windows without obstructing the *unaltered* window on the third floor and that portion of the ancient windows on the first and second floors, and the new upper windows could not have been obstructed in a more convenient manner.

After the wall was finished, A, in February, 1858, caused the altered windows to be restored to their original state, and the new windows to be blocked up, and then called upon B to pull down his wall, which was then obstructing ancient lights only. B refused to do so.

This was an appeal from the decision of the Court of Exchequer Chamber. The cause was tried before Chief Justice Cockburn at Guildhall, February, 1859, and a verdict was taken by consent, found for the Plaintiff A, subject to a special case embodying the facts.

Whilst the wall of B was being erected A gave B notice to desist from erection thereof.

B contended that A by the character of the alterations made by him in the old lights, and by the nature and position of his new windows and lights, manifested three distinct purposes.

First, His intention to assert a permanent claim or right to the new windows and lights, and thereby induced B to oppose, and justified him in opposing the encroachment made by an obstruction of a permanent nature.

Secondly, That A, by the alteration of the old windows and lights and the opening of additional ones, abandoned, or forfeited, or lost his original right to the access of light and air as afforded by the old windows.

Thirdly, That A, by the restoration of the old windows to their original state, did not regain as against B his original right to light and air, or acquire any right or title to require the removal of the building of B, or to sue in respect thereof, as, by the subsequent restoration of the said windows to their original state, the easement or servitude to which the premises of A were originally subject could not be reimposed.

The Lord Chancellor, in delivering his opinion, quoted the 2 & 3 Will. IV. c. 71, as to prescriptive right, and added upon this section it is material to observe that the right to what is called an ancient light now depends upon positive enactment. It is matter "*juris positivi*" and does not require, and therefore ought not to be rested on any presumption of grant or fiction of a licence having been obtained from the adjoining proprietor. Written consent or agreement may be used for the purpose of accounting for the enjoyment of the servitude, and thereby preventing the title, which would otherwise arise, from uninterrupted user or possession during the requisite period. This observation is material, because I think it will be found that error in some decided cases has arisen from the fact of the Courts treating the right as originating in a presumed grant or licence. It must also be observed that after an enjoyment of an access of light for twenty years without interruption, the right is declared by the statute to be absolute and indefeasible, and it would seem therefore that it cannot be lost or defeated by a subsequent temporary intermission of enjoyment not amounting to abandonment. Moreover, this absolute and indefeasible right, which is the creation of the statute, is not subjected to any condition or qualification, nor is it made liable to be affected or prejudiced by any attempt to extend the access or the use of the light beyond that, which, having been enjoyed uninterruptedly during the required period, is declared to be not liable to be defeated.

Lord Chelmsford also laid down, in the course of his opinion on this case, the following important points of law as recognized and established:—

It is not correct to say that the plaintiff, by putting new windows into his house, or altering the dimensions of the old ones, "exceeded the limit of his right," because the owner of a house has a right at all times, apart of course from any agreement to the contrary, to open as many windows in his house as he pleases. By the exercise of the right he may materially interfere with the comfort and enjoyment of his neighbours, *but of this species of injury the law takes no cognizance*. It leaves every one to his self-defence against an annoyance of this description, and the only remedy in the power of the adjoining owner is to build on his own ground, and so shut out the offensive windows.

By the Prescription Act then, after twenty years user of lights, the owner acquires an absolute and indefeasible right, which so far restricts the adjoining owner in the use of his own property, that he can do nothing upon his own property, which may have the effect of obstructing them. The right thus acquired must necessarily be confined to the exact dimensions of the opening, through which access of light and air has been permitted. As to everything beyond, the parties possess exactly the same relative rights which they had before, the owner of the privileged window does nothing unlawful, if he enlarges it, or if he makes a new window in a different situation. The adjoining owner is at liberty to build upon his own ground so as to obstruct the addition to the old window, or to shut out the new one, but he does not regain his former right of obstructing the old window, which he had lost by acquiescence; nor does the owner of the old window lose his former absolute and indefeasible right to it, which he had gained by length of user. The right continues uninterruptedly until some unequivocal act of intentional abandonment is done by the person who has acquired it, which will admit the adjoining owner to the unrestricted use of his own premises. It will, of course, be a question in each case whether the circumstances satisfactorily establish an intention to abandon altogether the future enjoyment and exercise of the right.

If such an intention is clearly manifested, the adjoining owner may build as he pleases upon his own land; and should the owner of the previously existing window restore the former state of things, he could not compel the removal of any building, which has been placed upon the ground during the interval, for a right once abandoned is abandoned for ever.

But the counsel for the appellant carried their argument far beyond this point. The part of the case, which was the most difficult for them to encounter, was that, which related to the unaltered window in the third floor. As to this they contended, that the alteration of the windows below and the addition of the windows above so changed the character of the previously acquired right to light and air, as entirely to destroy it. But it is not easy to comprehend how this effect can be produced by acts wholly unconnected with an ancient window, which the owner could carefully retain in its original state, and the learned counsel did not seem to expect much success from their argument in its application to the unaltered windows in the lower floors. As to these they contended that the owner of ancient windows is bound to keep himself within their original dimensions, and that if he changes or enlarges them in any way, although he retains the old openings in whole or part, he must either be taken to have relinquished his right, or to have lost it. But upon what principle can it be said, that a person, by endeavouring to extend a right, must be held to have abandoned it; when, so far from manifesting any such intention, he evinces his determination to retain it, and to acquire something beyond it. If under such circumstances abandonment cannot be assumed, as little can it be said that it is a cause of forfeiture. It must always be borne in mind, that it is no unlawful act for the owner of a house to break out a window, or to enlarge an ancient window, although in the latter case some difficulty may be thrown upon the adjoining owner to distinguish the old part from the new, and so to ascertain which part he has a right to obstruct and which is privileged from his obstruction.

The adjoining owner can therefore always protect himself by a little vigilance, and if he allows rights to be acquired, under shelter of which he is prevented using his land for the purpose of defence against the acts of his neighbour, he must blame his own want of foresight and precaution, and not the law, which will not permit an ancient right to be invaded upon any such assumed ground of necessity.

Such is the most recent and decided judgment in the highest court of appeal upon the matter of light and air, and must necessarily rule all subsequent cases. And this stringency of the law applies in the case, where a man has one window just sufficient for his purpose: an opposite neighbour desires to build up in front at a reasonable distance. The room with the one window might have all the light already possessed, and even more, if another might be introduced or the window enlarged; but this is not allowed, if the owner object, although his opposite neighbour might be willing to be at the expense.

We will now consider the French law upon the subject, and it is extremely simple, as explained in the following work in the library of the Institute:—

Mauuel des Lois du Bâtiment élaboré par la Société Centrale de Architectes. 8o. Paris, 1863.

By the French law no owner, can make an opening in his external wall, so as to overlook the property of an adjoining owner but under certain restrictions. It must have an iron grating, the bars of which must not be wider apart than 4 inches, or be enclosed by ground glass, fixed in with plaster so as not to open; and the openings, which may be of any size, may not have the sill lower than 6 feet above the floor. These precautions shew that such windows are a concession to give light to a room or closet, but so that the adjoining owner's property may not be overlooked. The builder must give notice

to the adjoining owner of such intended openings, and indemnify him for any damage caused by such openings; and the adjoining owner may close them upon buying the half of the wall.

These regulations attach to any wall within the distance of 6 feet from the land of an adjoining owner, and never acquire any prescriptive right. And the adjoining owner, if it be in the country, may at any time carry up another wall immediately adjoining the previous wall.

One may not have a window overlooking the neighbour's grounds, or a balcony or other projection, except there be a distance of 6 feet between front of the balcony or the projection or between the wall in which the windows are and the land of the adjoining owner.

Nor may there be an oblique view nearer than 2 feet from the end.

But supposing an owner has acquired the right of a direct view from a window in a wall, which separates two properties, still the adjoining opposite owner may erect a wall or building in front, provided it be at a distance of 6 feet from the face of the said wall, such distance of 6 feet being upon his own ground; and any return wall may be built, provided it be at the distance of 2 feet from the opening.

No prescriptive title precludes the right of the adjoining owner. Thus it appears that the French law jealously protects the rights of the owner of the soil, and allows him to carry up an erection, however it may affect adjoining owners, provided it be done at a distance of 6 feet within his own boundary.

The following are some of the most important recent cases published in the *Weekly Reporter*, 59, Carey Street, Lincoln's Inn Fields.

Lord Chancellor. *ISENBERG v. EAST INDIA HOUSE ESTATE COMPANY.* Dec. 9, 19, 1863.

Ancient lights—Mandatory injunction—Inquiry to assess damages.

Where an injury to a plaintiff's property is of such a nature that it may be amply compensated by a sum of money paid by the defendant, the Court will not grant a mandatory injunction, which would be injurious to the defendant without any corresponding benefit to the plaintiff, but will direct an inquiry as to the amount of damages.

Thus, where the erection of a building of greater height than a former one on the same site, was alleged to obstruct the plaintiff's light, the Lord Chancellor refused to exercise the jurisdiction of granting a mandatory injunction, but directed an inquiry before himself, to ascertain the damage sustained, and the amount of compensation.

This was an appeal from a decree of the Master of the Rolls.

Lord Chancellor. *JACKSON v. THE DUKE OF NEWCASTLE.* Feb. 20, 24; March 19; June 25; July 2.

Ancient lights—Injunction—Business premises—Possible future injury.

The Court will not interfere by injunction to prevent the obstruction of the ancient lights of a building exclusively used for business purposes, unless the obstruction would, to a material extent, render it less suitable for the business actually carried on there, even though, if the premises were to be afterwards applied to some other purpose, their value might be diminished by the threatened obstruction of light.

Accordingly, in a case where the injury by a threatened obstruction of light to the plaintiff's place of business was such as not materially to affect its value for the use to which it was then applied, and

was such as could be redressed by damages, the Court (on appeal) refused to continue the injunction, and it was agreed that the amount of damages should be assessed by the Lord Chancellor.

The propriety of a judge in a Court of equity making a personal inspection of the buildings in such a case considered.

This was an appeal from an order of the Master of the Rolls, granting an injunction to restrain the defendant from erecting, or continuing to erect, a wall on the site of certain stables of a greater height than the elevation of the old buildings as they formally stood thereon, so as to darken or obscure any of the plaintiff's ancient lights, or to obstruct the free access of light and air as heretofore to the plaintiff's premises in No. 21, Cockspur-street.

Master of Rolls. LAWRENCE v. AUSTIN. DURELL v. PRITCHARD. May 31; June 1, 6, 7, 8, 1865.
Injunction—Ancient lights—Damages in equity—Building completed before bill filed—Jurisdiction—
21 & 22 Vict. c. 27.

Where a building, which interferes with the plaintiff's right to light and air or any other easement, has been actually completed by the defendant before the bill is filed, the Court of Chancery, in the absence of fraud, will grant neither a mandatory injunction nor damages, but will leave the plaintiff to his remedy at law.

If any part of the building is unfinished at the date of the filing of the bill, the Court of Chancery has jurisdiction over the matter, and will grant an injunction as to the unfinished part, and an inquiry as to damages as to the finished part.

These were two suits relating to interference with ancient lights, and raising questions of a similar nature, and the Court gave but one judgment in both cases.

Lord Justice Knight Bruce. THE CURRIERS' COMPANY v. CORBETT. June 12, 13; Aug. 8, 1865.
Injunction—Ancient lights—Damages—Material injury—Mandatory injunction—Air—Custom of the
City of London—Prescription Act.

It is not every interference with the access of light which will entitle a plaintiff to the interference of a court of equity; he must show material injury in order to obtain the assistance of the Court.

Semble, per TURNER, L. J.—Where a bill seeks a merely preventive remedy, a mandatory injunction cannot be granted.

Quære, whether a mandatory injunction will be granted ordering the removal of works already completed.

This was an appeal from an order made by Vice-Chancellor Kindersley on the hearing of the cause. The facts of the case are fully stated in the previous report, *ante*, 538.

TAPLING v. JONES. March 16.

Ancient lights—Obstruction—Encroachment—Abandonment of right—Prescription Act,
2 & 3 Will. IV, c. 71.

In making alterations in a house which originally consisted of three stories, with one window in each story, A. altered the windows in the two lower stories, but so as to make them both occupy part of the old apertures, and retained the window in the third story unaltered, and built two additional stories, in each of which he put a new window. After these alterations were completed, B. built up a wall on the adjoining land to such a height as to obscure the whole of the lights in A.'s buildings. It was

impossible for B. to obstruct the upper windows without obstructing the unaltered window on the third floor and that portion of the windows, which occupied the site of the ancient windows on the first and second floors: and the new upper windows could not have been obstructed in a more convenient manner. After the wall was finished, A. caused the altered windows to be restored to their original state, and the new windows to be blocked up, and then called upon B. to pull down his wall. B. refused to do so, and an action was brought.

Held, that B. was not justified in maintaining the obstruction to A.'s lights.

Held, further, that the obstruction by B. of such of A.'s lights as were ancient was an illegal obstruction from the beginning.

Renshaw v. Bean, 18 Q. B. 112, and *Hutchinson v. Copestake*, 9 C. B. N. S. 863, overruled.

This was an appeal from the decision of the Court of Exchequer Chamber, reported 12 C. B. N. S. 826, affirming the judgment of the Court of Common Pleas, reported 10 W. R. 441, in an action for obstructing and keeping obstructed certain lights of the respondent, in a warehouse No. 107, Wood Street, Cheapside, in the city of London.

The cause was tried before Cockburn, C.J., at Guildhall, in February, 1859, and a verdict was, by consent, found for the plaintiff (the respondent), subject to a special case embodying the facts.

N.B.—The appeal to the House of Lords largely quoted in the preceding pages

Vice-Chancellor Wood. DENT v. AUCTION MART COMPANY (LIMITED). PILGRIM v. THE SAME. THE MERCERS' COMPANY v. THE SAME.

February 21, 22, 23, 26, 27; March 2, 28, 1866.

Ancient lights—Carrying on business beneficially—Injunction—Offer to abstain from proceedings—Town and country light—Possible future uses of the premises—Jury—Lateral light—Air—Damage to foundations.

The summing-up of BEST, C.J., in *Back v. Stacey*, 2 C. & P. 465, commented on. The expression there used, "carrying on the business beneficially," does not mean merely "not losing customers," but also "being able to carry on the business as beneficially to the health and ability of the person carrying it on."

Where substantial damages, as distinguished from some £5. or £10., will be given at law for interference with light, the Court will interpose by injunction. The Court will not allow a man to inflict an injury upon his neighbour, and then purchase him out without any Act of Parliament having been obtained for that purpose.

Nor if a person complaining of interference with his light has offered to withdraw his opposition for a fixed sum, will the Court gather from that fact alone that the damage is not irreparable, and send the case to a jury to assess the exact damage done. Were the Court to do so, it would be conceding to persons desirous of erecting buildings the existence of an unknown Act of Parliament, with the provisions of the Lands Clauses Act, and enabling them to force the sale of the plaintiff's right, not at his own valuation, but at the estimate of a jury.

The case of *Yates v. Jack*, *suprà*, 618, has made it clear that the right of a person living in a town to protection from interference with his light is not different from the light of a person living in the country.

The observation of the Lord Chancellor in that case, that he was to regard the possible uses to which the plaintiff's house might be put, may be reconciled with the malthouse case—*Martin v. Goble*,

1 Camp. 320—by supposing that his Lordship meant the uses of the house as it stands at the time of the complaint, and not if and when rebuilt for some other and totally different purposes.

In cases of this kind the following defences are useless :—That the plaintiff will still have as much light as many other persons; that they might have made their windows larger; that they had sometimes used Venetian blinds; that a room said to be used for a certain purpose was not a good one for that purpose, and that it had been used for that purpose *clàm*; and that the defendants would face their buildings with glazed tiles.

The doctrine of the Court as to interference with air rests on nuisance.

The benefit of sending a case of this kind to a jury is doubtful. The jury can contribute nothing but the view; and their view is likely to be prejudiced, since they see only the existing state of the light, which may be equal to the ordinary state of the light in the neighbourhood.

Interference with lateral light should be restrained; for if it were not, all the neighbours round might obstruct the light, and so in many place almost total darkness might be caused.

If at the time of filing the bill such damage is being done to the foundation of a house, that the plaintiff entertains serious fear lest the house should come down, the fact that, at the hearing when the defendants have completed their works near the foundations, the actual damage done is trifling, will not prevent the bill from being upheld, even if the defendants show that they never once departed from their original plans of working.

Form of order restraining the erection of buildings, following that in *Stokes v. The City Offices Company*, 13 W. R. 537.

These three suits came on together for motion for decree.

Mr. ARTHUR ASHPITEL, Fellow, said they were extremely obliged to his learned and excellent friend who had just addressed them for the valuable information he had conveyed; but though he had pointed out very ably what were the grievances of the present system, he had not suggested adequate remedies. He believed, with regard to the question of light and air, like all questions of right and wrong, and all questions of equity between man and man, it was totally impossible to provide an Act of Parliament to put them to rights, any more than it was to comply with the request of the Fenian gentlemen the other day, who said “Why don't they pass an Act of Parliament at once to make ould Ireland happy for ever?” He believed no act could ever be drawn to meet all the numerous, involved, and intricate questions arising as to the rights and wrongs of light and air. But there was one simple rule amongst themselves—a good old Christian rule—to do to others as we would wish them to do to us—treat your neighbour as you would wish him to treat you! Abstract nothing from him that is his! Use your own so that you hurt no one else. *Utere tuo ut nemini non lædas*. This was the great maxim of the Roman law; but his friend had enunciated some principles which were rather startling to him. He had sketched a house, divided into a certain number of storeys, which belongs to A; and also a house on the other side of the way, belonging to B. His friend asked “why may not B raise his house to the same height as A has done?” He, the speaker, replied “A bought that property because there was a certain light coming there. A says I am a watchmaker; I want a great deal of light for my work;” and he asks the former proprietor “what must I give you per annum as a rent for those premises, or what sum must I pay you for the absolute purchase of them?” The owner demands a large price, because he is aware there is ample and uninterrupted light for his business, and on that account the premises are valuable, which they would not be if B raised his house and obstructed such light. What then became of the question of the right or the wrong if the one man was to be at liberty to raise his building so as to obstruct the other

man's property, and ruin his business? [Professor DONALDSON. What is the equity of that?] Mr. ASHPITEL. The equity that what A purchased he should be entitled to enjoy, with all its rights appertaining thereto; and no man ought to deprive him of those rights. [Professor DONALDSON. Unequitable rights!] "Unequitable right" is a contradiction in terms; it is as much as to say rightful wrong, if there is justice between man and man; if he had a right to anything he possessed, he had a right to the light and air which came from the atmosphere; and if he purchased that property knowing the house opposite was of a lower height, his neighbour had no more right to deprive him of that light and air than he had a right to take anything of a more tangible nature from him. [Professor DONALDSON. Not as a legal right.] Mr. ASHPITEL. That which was legal was equitable in principle, though, perhaps, through technicalities, it might not be so in practice. He only laid down this principle; if he bought a property because it was in such a position that it was advantageous and valuable to him on account of a certain position of the property opposite, he bought it with all its rights, and if another man infringed upon those rights he did him wrong and harm. Now the present argument seemed to shew that they could not do much in altering the law in this matter, and they could not escape this condition, that if A were a watch-maker, giving a large price for his property because he could exercise his trade there, they could not alter the law so as to enable B to injure A for his (B's), own private profit without inflicting a wrong, an injustice towards him. [A MEMBER. That supposes the properties to be situate in public highway?] Mr. ASHPITEL did not care whether the open space was private or public; he did not consider it made any difference in the principles, if he made watches there, whether it was lighted over a private garden or a public highway. His friend had confessed it was contrary to law. He put it to every one present, whether it was not contrary to justice and equity between man and man, that, having bought property with certain rights, those rights should be taken away for another's profit? If they thought in this room any man having purchased property with certain rights attaching to it, that any person might breach those rights, there was an end to respect to *meum* and *tuum*.

Professor DONALDSON said his friend was right in the law, and he (Professor Donaldson) had himself affirmed that view in the cases he had quoted; he went to the abstract principle of right and said—persons who had rights must provide easements on their own property, and not go for easement to other properties.

Mr. ASHPITEL said a man having rights and easements, his neighbour ought not to rob him of them. In what way was he to provide the light on his own property? To provide the light was absurd in terms. How could it be done? They got it from the heavens, and if it was obstructed in its passage there was an injury. It might as well be said you shall breathe no air except that which is generated on your own premises. What is an "easement"? The *servitus* of the Roman law, a right of water-course, drainage, light, air, and sometimes of walking (*spatiandi*), and even of pasturage on the freehold of a neighbour. But it must be confessed, after all, they were met here not to talk so much about right and wrong as the practices of architects in this matter. He found in his own practice—and he had had a good deal to do with the subject—two sorts of cases. The one where a man boldly and flagrantly invaded his neighbour's right, trusting to the quibbles of the law to scramble through somehow. He had heard of a case where a wall was run up before a window during the night. In the morning the gentleman's little boy went into his bedroom exclaiming, "Papa, breakfast is ready," but the gentleman remarked, "Why, it is not light yet." They had built up the wall during the night, and absolutely blocked up the window. There was also a case where, within four feet of a room appropriated to gun-making—a trade next, perhaps, to watch-making requiring the best light—an adjoining owner ran up a building thirty feet high. There was the gun-making room, here the four feet of space, and

the adjacent owner B ran up, on his own ground, a building something like thirty feet high. The intermediate space C belonged to A, the gun-maker, and gentlemen were found to file affidavits stating that they did not believe any damage was done to A. But Vice-Chancellor Kindersley remarked, "You might as well tell me that you could lower me down a well thirty feet deep, and say I could see as well as if I were on the surface." He thought the discussion to-night, according to the notice issued, was not so much upon the law on the subject as the practice among themselves. Was it legally or equitably justifiable that one should, at a distance of four feet from a room, run up a wall thirty feet above this building? The parties had enjoyed that window for forty years or more. It must be confessed there were errors on both sides. In the language of the poet—"Iliacos intra muros peccatur et extra." He knew a case where there was a house with garret story, the roof had been taken off and the walls raised up so as to make it a square storey. In such a case not a pin's worth of injury was done, for the sky line was unaltered, and yet an action was brought. He remembered in the course of ten days in last year he was called in, in four different cases, in two of which he could not support the claim for damages for a moment, in another case the injured party was recouped by an alteration and small payment, and the remaining one was taken into court and won. All this brought him really to the main point before them this evening—that was the paper of his friend Professor Kerr. They had hitherto gone into court giving abstract opinions; those opinions, as they all knew, were very much based upon the statements of clients that such and such were facts, which facts other witnesses were to prove. Now one of the facts the most often asserted, and which he believed was the most fertile source of litigation, arose from this simple circumstance—viz. when a building was pulled down it was usually done in the spring, and the re-building in the summer months, when of course there was the greatest quantity of daylight. The consequence was an enormous flood of light fell upon the premises during the rebuilding, and the neighbours went on for months enjoying a greater amount of light than ever they had; but as the building grew up to its old height the days got shorter, and the tenants of the opposite premises found that they could not work so long without gas as they had been able to do before the new house was finished, and they began to complain that their opposite neighbour was building out their light. They would prove that they could not work so late by an hour at boot making or stitching as they had been accustomed to do, and yet perhaps the same wall had not been carried up an inch higher than it was before. This was a very fertile source of litigation: you give a man a temporary advantage and he does not like to part with it, just as it is said there are some men who cannot bear to return a borrowed umbrella. But now comes the question, how is the quantum of privation of light, if any, to be solved and brought into a definite shape. The old rule used to be this: a section was made of the two properties. A window is here, and a building stands opposite. Let us suppose this last building was formerly of such a height as to form an angle of 22° with the horizon as viewed from the window; the walls are now raised so as to form an angle of 40° : the difference, 18° , was said to be the measure of the privation of light, and this was not far wrong, as far as height alone was concerned. But they then fell into the same error that some other gentlemen had also fallen into. There had been an attempt to settle all questions by one sweeping rule, viz. to consider a height equivalent to an angle of 45° as affording a sufficient light to any window under any aspect or circumstances. This was falling into two absurdities; first, that it would be illegal for a man to build a narrow erection,—say a chimney shaft, 18 inches wide, if above this angle, which would practically not be of the slightest injury; while below this angle a row of houses of a hundred times the superficial area of such chimney, of course an obstruction a hundred times as great, would be perfectly legal. The second error was, to apply this rule to all aspects. Surely if an angle of 45° was enough for a window lighted from the south, it could not be sufficient for one which could get light only from the east or west, where the sun is at its

lowest. But it had been said: "Oh! this angle must be enough, as it is called the portrait painter's angle." It is very true that there was at one time a fashion among portrait painters of putting a sitter by a window and closing the lower half of the shutters, so that the light fell upon his temple at an angle of 45°, but they themselves painted at an open window, and in the largest angle of light they could get; so that the old conventional custom of portrait painting must be considered as quite inapplicable, as quite beside the question. Having explained, then, as well as he could what the usual way of considering the quantum of diminution of light, and having shewn that the obstruction of the same depended nearly as much upon width as upon height, he would venture to take a step further, and consider Professor Kerr's system. He thought that gentleman had hit upon the right way to set to work, and, as he understood him, his principle was to suppose that where there is a wall with an opening, if he looked through this opening or window, he saw the vault of the heavens—a sky space resembling half of a hemisphere. Mr. Kerr then proceeds to divide this half hemisphere vertically and horizontally into any number of equal divisions, resembling the latitudes and longitudes on a terrestrial globe. On plan the line of division representing the sky would be a semi-circle. Now, if this plan were divided into any number of equal parts, it would be seen at once that only a very small quantity of light could enter from the side divisions, as so much would be obstructed by the thickness of the wall. More light would be admitted by the next and the next divisions, as front lights are of course more direct, and therefore much less impeded than side lights. In like manner, on the vertical section the sky line would be represented by a quadrant; and in like manner the upper division would admit the least portion of light, as so much would be impeded by the thickness of the window back, cill, &c. Now according to the quantities of these angles by which such light enters, calculated both vertically and horizontally, Professor Kerr gives a value to each division, as a *proportionate* measure of the light entering through each divided space of the apparent sky surface. Having done this, he describes a like number of squares in a manner similar to what is called a map of the world on Mercator's projection, where each square represents an equal number of degrees of latitude and longitude, without regarding the fact that on a globe the degrees of longitude diminish in every latitude the meridian lines running up to the pole, and finishing all in one point. Navigators practically prefer the Mercator system, but as a perspective representation, or regarded orthographically, it is incorrect. Every square is correct in itself as to degrees of longitude and latitude, and all they had to do was to give to every square its respective value. Now, Professor Kerr says, having done this, he would plot out on this Mercator map the line of any houses visible against the sky, and calculate the quantity of light entering the window. He would then plot the lines of any new buildings, on any portion raised by the building owner, and the difference would show the quantity of light obstructed. [PROFESSOR KERR—The quantity of sky surface.] Certainly this was quite independent of light from the rays of the sun. The idea appeared to be extremely valuable. Of course it was subject to modification: a man, whose window faced the south, could do with a considerably less amount than a man whose window faced the west, taking the average of the year. A man whose business was done principally in the afternoon, when the sun is declining, valued west light more than an aspect to the south. He believed there was no possible rule they could lay down to suit every case. They talked about the hardship of the law: the law was not one-sided. His friend must have forgotten the decision in the case of the malting-house which was afterwards converted into a dwelling-house, in which the Court held that the ancient prescriptive right was to so much light as was necessary to carry on the original business for which the building was erected, and not for the altered purpose. He said it was not equitable to abridge a man's vested rights any more than it was to demand a right which he never had before. The law of light and air now stood as he (Mr. Ashpitel) believed in the same

position as that of any other easement; as, for instance, that of water power. If a miller has a right to as much water as will efficiently drive a mill of four pair of stones, the owners of the land above the mill may take any surplus water for the purpose of irrigating their land, but they must not take so much as to lessen the efficiency of the mill. On the other hand, the miller must not expect as much water as will drive six pairs of stones. Nor must he expect as much water as will drive his mill all night as well as all day, if for the last twenty years he has worked by day only. As he understood his friend, Mr. Kerr, he said this:—"I cannot measure light and air like wheat in a bushel, or water in a cistern, but by my system I can get a *proportionate* measurement of light abstracted; I can calculate a per centage." It was immaterial to him whether they said this quadrant was 1, 3, or 5, or whether they went up to 20, 30, 40, or 50. He could show them mathematically, in the same way that sailors worked upon the Mercator chart,—he could show them proportions gained or lost; and he did think that was a most valuable point. Of course it must be modified with regard to the application of it to purposes of business. The obstruction of light which would do no harm to a man as a malster would be ruinous to a watchmaker, and all those points must be taken into consideration; but till this time they had no adequate idea of measuring the proportion of light abstracted, nor its relative value: he thought they had now, and it was a step in the right direction. Unhappily too many people were carried away by their feelings in litigated cases, and tempted to become partisans, and some had not the moral courage to tell their clients what they thought was right. Hitherto it had been a difficult thing for anybody to do so, except in very strong cases, because there was no way of measuring a quantum, and a vague suggestion that really you could not see much cause for complaint, was always met with "Oh! but Jones will prove he cannot see to work as he used to do, he will swear that." To cite a case that occurred the other day—A house was re-built, almost exactly as it had formerly stood, but a little bit of a gallery or foot bridge had been carried from the back of one house to the back of another, across a garden at some distance on the north side, and the tenant, a cobbler, averred that owing to that gallery he could not see to make shoes so well as he did before. He (Mr. Ashpitel) believed that man spoke the truth to a certain extent. The house had been pulled down in the spring, and he had had a large flood of light during the whole summer, and though the house was re-built to an inch the same height as before, when the days got shorter and he could not see so well as before, the cobbler argued "*post hoc ergo propter hoc*," because he could not see so well as when the house was demolished, the man thought he had been done an injury! He (Mr. Ashpitel) believed that was at the root of half these cases. He thought they ought to remember two simple rules as to all property, particularly what the law called incorporeal hereditaments and all easements; first, in the words of the Roman law, he had cited before, "exercise your own rights so as not to injure those of your neighbour;" and next, "if the existing rights of your neighbour abridge the value of your own property, remember you bought or obtained it subject to those rights, and paid less for it accordingly." What they were talking about was inherent prescriptive right which could not be abridged without they touched the vitals of all legislation on property. Gentlemen would remember, in the early part of that beautiful book the *Cyropædia* of Xenophon, the case of the tall boy who had the short coat, and the short boy who had the long coat. Once interfere with the rights of property, once try to do men good against their will, except where "*respublica quicquid detrimenti capiat*," and there is no knowing the opportunities you give for fraud or private revenge. One word more he must say. If they obstructed light and air they obstructed health. Look at the buildings now in the City, where the rooms are lighted and ventilated by wells 10 feet square and 60 feet high, artificially illuminated with glazed tiles, where sun and wind never comes. Only think what pits these would be for cholera or fever, if they were sent amongst us. These were higher considerations than ground rents, or the getting most money

out of the least space. Higher considerations than the exercise of artistic or constructive ability. Let them all remember, if they sensibly diminished the light to a neighbour's property, they also lessened the free passage of air, and thereby not only risked his health but also their own, and that of the public.

Mr. JENNINGS, Fellow, said they had to consider the subject now before them, both as to what the law is and what in justice it should be. The law at present is certainly most unjust, but the state of the law previously to the Act referred to was perhaps, on the whole, satisfactory, as when carried out with a jury it allowed an equitable amount of latitude according to the circumstances. To consider a person had an abstract right to acquire easement over another person's property is interfering with his simple rights. In the case of houses it might be that a large number were built upon land which belonged originally to one owner, who sold them one after another to other parties; therefore it was reasonable to suppose the property was sold subject to certain rights which it was to be presumed could not always be clearly proved. With regard to rights over their neighbours' land, it was a most unfair thing when not originally granted. He was concerned in a case in which a factory eight stories high was built up adjoining a narrow strip of land, and it was impossible to shut out easement, which now prevents the adjoining land being made any use of. When consulted he said the owners could not help themselves, and they must put up with it. He thought, therefore, it would be a much better thing if the law now took, as in the French cases, the exactly opposite course. Then it came to legislative enactment as to what should be provided in the way of light and air. The law which was in existence at one time was, that in no street should a person be at liberty to build a new building which did not leave 45° of light. That was reasonable with regard to new erections, because in making new streets it was assumed that there should be a reasonable law for a new state of things. In the case of air from the back of a building, it was equally beneficial that persons should be precluded from building so as to interfere with the general health of the neighbourhood; therefore the legislature should provide that proper open space should be left at the backs of houses, as well as sufficient width of streets, in laying out new thoroughfares. The difficulty that occurred in dealing with old streets was very great, and one that constantly arose. In the City of London the difficulty of making improvements had been much increased by the alteration of the law. He thought it was better to give no more right of light and air than the owner had on his own property. On the subject of light and air, with the aid of photography, they could arrive with certainty at the amount of light; and it was easy to measure the amount of light at one time and another, so that there was no difficulty in arriving at it if they took the means properly. Mr. Donaldson was engaged with himself in a case in which the jury held that because the servants said they could not see to work in a place so well as they could before, an injury was inflicted; and the judge said if they could see to mend pens at one time and could not do so at another, that was an obstruction of light which would entitle them to an injunction.

Mr. WILLIAM WHITE, Fellow, said the point his friend had started was one which occurred to him while Professor Donaldson was making his remarks with reference to the legal and equitable rights of the parties B, A and C,—the rights of the man C in raising his building and obstructing the lights of A. As Professor Donaldson said, it appeared that the law was clear, and forbade the raising of the building, but he did not think it was so clear what the equity of the case might be, inasmuch as in many cases it would be perfectly justifiable. The whole plot might be evidently building ground, laid out for the purpose of building houses of the same class as those adjoining. People might not be found to take the land. One person at the end of nineteen years might take one plot, and because he went over

the twentieth year he was not to build a house of a certain height—that was supposing it to be a public highway, the houses being laid out to be carried on upon a similar plan. The houses might stand unfinished for twenty years; and though the plan showed they were intended to be carried out, yet the law prevented it. In reference to Professor Kerr's plan for measuring out each space of light, he thought the paper might have been accompanied by one or two slight woodcuts, just enough to shew the manner in which the several parts were to be connected and referenced, and also the manner in which he determined the relative value of the several measures, and the reduction of the spherical segments.

Mr. RICHARD BELL, Fellow, thought there was an object beyond discussing the practice in these matters; for he was in hopes by these discussions they should by long or short reasoning improve the law. He did not agree with Mr. Ashpitel that law was equity in all cases. [Mr. ASHPITEL—It ought to be.] Professor Donaldson had made a sketch of a house 30 or 40 feet high on one side of a street, with houses 20 feet high on the other side, and his friend Mr. Ashpitel put the case that, having purchased that higher house with a certain right of light, neither by law or equity ought he to be deprived of that light, nor any part of it. That seemed to him an insufficient reason for any such right to be established. There was no principle in it why that should establish a law for preventing the neighbour on the opposite side of a public thoroughfare from carrying his house to a certain height, at least as high as that claiming the right of light. Up to a recent period it was understood that they might build on each side of the public streets as high as they liked. [Professor DONALDSON—It was the old law of the City of London. Mr. ASHPITEL—It was entirely a popular fallacy.] The *custom* was, that in the City of London they might build upon any old foundation to what height they pleased. [Professor DONALDSON said he quoted from one of the judges that that was the *law* of the City of London.] He, Mr. Bell, thought, so far as the public highway was concerned, as they got light from over the highway and not from over the opposite side of the street, although the highway did obtain the light therefrom, that ought to be a line of demarcation, and any restriction as to the lights of houses on either side ought to be governed solely by the requirements for public health. As to the rear of houses there was no prior law to that which now exists. In valuing a property they looked around it and noted the objections, and among them easements of light, that decreased the value of the property. In like manner, if his friend bought the whole of the houses on one side of the street, if the law was such, and he might expect those on the opposite side to be built up to the same height, the price would be regulated accordingly, though probably the same value in either case. He could not sit down without expressing his dissent from Mr. Kerr's principle of measurement of light to windows. He thought there was one grand mistake at the outset. His friend Professor Kerr told them it was the province of the surveyor to furnish the judges with the facts, and they would administer the law upon those facts. He also said many surveyors gave empirical and dogmatic evidence without giving reasons for it. Now in my evidence, he says, I give facts; I give accurate measurement of the light obstructed to any window, by measuring the sky surface excluded or hidden from the window by the new intervening erections, on the following principle:—First, the light approaches a window from the sky as if it were a large concave sphere, and the rays of light converge from its concave surface through the window. But he (Mr. Bell) wanted to know first of all, was it a fact, with respect to the diffusion of light, that the sky resembled a large concave reflector, and that the rays of light converged at all to any window. If so, suppose they had a house with three windows wide and three in height, to which of them did the rays converge? [Professor KERR—Take the middle ones as an average.] He (Mr. Bell) said, but they did not converge at all. Then how does Mr. Kerr proceed to measure the area of the concave hemisphere? why, from a point in the centre of the outside

of the window he strikes two semicircles, one horizontal, the other vertical, and he divides these magic circles into certain parts, and multiplies the one into the other—i. e. two imaginary Dutch ovens with the top and bottom out, multiplied into each other, give the area of the imaginary concave hemisphere. But why are the circles struck from the centre of the outside of the window? we have no reason given for that. The thing would answer very well if they were flies and carried on their business *outside* the panes of glass; but let it be remembered that the subject matter of the complaint is that you are about to obstruct or have obstructed so much of the light that I enjoy or enjoyed *in the room*, lighted by a certain window. Let his friend, then, go *inside* the room. Now he (Mr. Bell) would shew them that they could just as easily, and more accurately, measure the light on the inside, by projecting the points on to all sides of the room from the sides and the head and sill of the window, as the sky surface by the mode of his friend.

Professor KERR, to prevent misunderstanding, would say he could measure as easily *inside*, if they supposed a reflector inside shewing what light there was outside.

Mr. BELL did not admit any reflector at all; he said there was no converging of the rays. His friend said he measured the light to a skylight in the same way as to a window. Now that skylight might be 50 feet long; but they were still *outside* the glass, with one point for centre many feet above the level where the light would be used. Let us take the following diagram, shewing a sale-room, light towards the North. There the light is used at the counter, say 9 feet below the bottom of the skylight, and the light flowing to it comes from points nearly vertical. The Professor says that the way to measure the light is to take the radius for two arcs (vertical and horizontal) from the centre of the skylight, and divide them as before stated; but that mode makes the light nearest the horizon of equal value to that near to and beyond the zenith, which it is not for the purpose required, is that indeed which he could not use, for he must have the light coming from above and on the same side as that on which he stands, otherwise it would throw the goods into shadow, and he would not see the true colours. A broker came forward on one occasion and said, "I as a broker ought to know about these matters more than an architect; a north and north-east light is absolutely essential to our business, and this is the best lighted room I know." And so both the Judge himself and the broker were satisfied that the light used was from the north, whereas in fact he was using only 10° of north light and 28° of south light. He (Mr. Bell) therefore expressed his dissent from the Professor's doctrine. His friend must measure *inside* the room, where the light was positively used. Judges would very soon see that they had then positive facts to deal with, although they might run into the mistake, because a self-satisfied broker told them so, that a north light was being used, while all the while it was a vertical, and so much of south light as could be obtained without having the sunshine with it. He for one would have been glad if his friend had had more time to bestow upon his work. If he could find an opportunity to revise it, he would find in some cases that he had said what he did not quite intend, and if he would correct such redundancy it might give more light to his readers; but at the same time he (Mr. Bell) felt indebted to him for what he had done. He made these observations with great respect, hoping they would be worthy of the attention of the administrators of the law; inasmuch as he considered that the principle and mode of measurement advanced by the Professor had led them into erroneous views, that might be productive of injustice. The true measurement on all occasions could only be made and the positive injury discovered—inside the room, and not by the measurement of the sky surface only on the Professor's plan.

Mr. THOMAS MORRIS, Associate, would say a word upon the scientific part of the subject, which appeared in danger of neglect. There had possibly been over-much attention to the law, and too little discussion about that which especially concerned architects. He would pass over the legal part of

the question, except to say that Mr. Kerr spoke of a "necessary" quantity of light. Now, when a man had a right, though it were only in a window, it was an indefeasible thing, and the law would respect it as much as the money in his pocket. It was as unjustifiable to diminish a man's light on the plea that he had more than was necessary, as to deprive him of his surplus cash. No one would leave such a point to arbitration. With regard to the "standard" of light, he thought there was some ground for difference of opinion. Dining rooms in the fashionable quarters of London were purposely kept obscure; they were chiefly used for a special purpose after dark; a very moderate light was sufficient for breakfast and luncheon, and a certain dimness prevented observation from people passing outside; it also helped to keep the rooms cool till the great object of their use came on, when they were suitably prepared and lighted by artificial means. It might be convenient, therefore to put the scale of another author in juxtaposition with the one before them, and he would mention Robert Morris, who wrote a book 180 years ago, in which he put forth a very simple proportion for lighting rooms. When he had found the cubical contents of a room, he took the square root of those contents, and so determined the superficies of window aperture. To give an example in round figures, let a room be 12 feet square and 12 feet high, having a cubic capacity of 1728 feet. The square root is over 41, and this indicates the lighting surface. If the aperture commence at 18 inches from the floor and finish at 18 inches from the ceiling, the height is 9 feet, and the width must necessarily be about 4 feet 6 inches. This appears a safe rule, and may be referred to in Gwilt's "Encyclopædia of Architecture."* It exceeds by one-half Professor Kerr's ratio of 1 foot in width of window to 50 superficial feet of floor. The atmosphere, he scarcely need remind them, was not a reflector. It surrounded the earth for a space of about 40 miles, and when they looked horizontally at distant objects, as at the setting sun, such objects were seen through hundreds of miles of air; when they looked vertically upwards the eye had to pass through about 40 miles of atmosphere; or, taking the density of the air at the level of the earth, which made it only equal to about 5 miles, even that showed the great transparency of the air, and its consequent unfitness to act as a reflector. But supposing the atmosphere were a reflector, they must consider the periphery of such reflector. Taking the radius from the centre of the earth, it would be a radius of 4000 miles; the half of that would give a focal point (at which the rays would meet) of 2000 miles. That enormous radius would show that for all ordinary purposes it must be looked upon as a plane, not a concave, reflector, and the rays from a plane reflector would come straight forward. But if it were a concave mirror, with rays converging in every direction, those rays were merely reflected, and there must be original or incidental rays before there could be reflected rays. Therefore he thought it could only be rightly considered that the light which came into a room came in straight through the wall, and was proportionate to the size of the window and the quantity of light in the atmosphere. In proportion as they had light in the atmosphere so would their room be well or ill lighted. The simple course in cases of obstruction, then, was to look outside and see whether there was anything to prevent the flow of light, not primarily into the room, but into the atmosphere about, and from whence the light must be considered as falling straight into the apartment. He hoped these simple suggestions would be useful to Professor Kerr in his revision of his work, which was a very ingenious one, and only required to be adapted to the incontrovertible circumstances of physical action.

After a few observations and illustrations on the same subject by Mr. W. A. CARTER, Associate—

Mr. H. R. NEWTON, Fellow, remarked that this discussion shewed them what a difficult subject they had to deal with, and how they were reduced to the state in which they were by legal enactment—he would not call it iniquitous—but at all events most aggravating in its effects. The object of any

* Article "Windows," p. 751-761.

discussion, he thought, should be to consider in what way they could possibly give effect to the Act in what may have been the true sense intended by its framers. On the one hand, if the framers saw the severe tendency of their enactment, probably they imagined that it would be simple to remedy it after a little experience; and if, on the other, they did not foresee the difficulties, it is probably that the Act does not express their intentions in the main, or is misconstrued, as it is impossible to suppose that they, or the Legislature, intended to give a lapsing right of freehold over adjoining owner's property; or that an existing owner's (A.) only remedy was within a certain number of years to defend himself against B. by building, when he (A.) might be prevented in his turn by C. or D., and when other enactments as to the manner under which property is held by lease, or under trust, might also bar any action at all in defence of rights until it was useless, and after B. had acquired absolute rights. It was, however, too late in the evening to go minutely into that portion of the question, or into the intricate problem which Professor Kerr had propounded; but he thought, when that cage-like figure, either on paper or by model, was submitted to a jury, they would have great difficulty in understanding it, however clear it might be to the legal mind of the judge. Even at best it was only an elaborate compromise, and if it was a question of compromise, it ought to be settled on simpler grounds. He thought the best thing they could do was, after having been so long a time in this difficulty, to consider some practical amendment of the Act under which they suffered. They had got into greater difficulties than they were in before; and by every case that came before the Court, it was shewn into what depth of mire they had been dragged. The first point was to do something by which, say in twenty years, they might be brought out of all the present difficulties as to rights of light and adjoining owners, and for the present moment there was no reason why some small amendment of the Act would not effect a benefit. For instance, why not create a legal ability to give notice in the case of any building to be created by the authority or under the sanction or jurisdiction of the Metropolitan Board of Works, that whatever lights were created by that authority they should not override the rights of the adjoining owner. He repeated he apprehended the present Act did not intend to deprive any owner of his rights, but it was most clumsily put together, and now they had to get over the difficulty with regard to certain rights acquired since. Except, therefore, in the sense referred to, the passing of any amendments to the present Act would be a most intricate matter altogether, and he therefore thought it would be better to look forward to the future, so as to do away with the present Act, and obtain a sound, new, general measure, and until then suffer patiently what we were so unfortunately accustomed to.

Mr. C. F. HAYWARD, Hon. Sec., would say a word upon the first point which they were called on to discuss, viz. the "evidence of architects on the obstruction of ancient lights," which would illustrate Mr. Ashpitel's remark, that the uncertainty of the law led individuals to fancy they possessed or had acquired certain rights not actually existing, thus leading to a great deal of litigation. As the discussion was not intended to refer to London alone, but to the whole country, he would mention a case connected with his own professional practise, in which, last autumn, two quarrelsome neighbours went to law on a point of light and air, which was absurd in itself, but which elicited a very clear statement from Chief Baron Pollock. The facts were these: On one side of a public road, about 21 feet, was an old two-storied house; on the opposite side was a garden wall, 7 feet high, the house belonging to which was some 200 or 300 feet off. This garden wall was pulled down, and rebuilt to the height of 8 feet 6 inches. Architect's evidence was brought to shew that the house was darkened by this extra foot or so of height in the garden wall, and other evidence to prove that a person could hardly see to read, except at the window, and that the housemaid could not see to clean the house as formerly. Professional evidence was thus found on the one hand to declare that the injury was great, from the loss of light and air, and this was carried by counsel so far that England was declared to be a country

which would not be worth living in if the owner of a house on one side of a street was liable to have a wall built opposite him on the other side of the street; while on the other hand, architects' evidence was brought to prove that there was no material injury, and no appreciable diminution of light or air. This latter view was accepted by Chief Baron Pollock, who stated that as the law had been very strongly put on the one side, he would put it equally strong the reverse way, and said that England would hardly be worth living in if a person owning a piece of land on one side of a public highway was not able to make use of that land for building because his neighbour opposite owned a house and objected to any obstruction of his light and air. But here a neighbour went to law with his opposite neighbour because of a 7 feet garden wall. It was satisfactory to know that cases of this kind were too costly to be of frequent occurrence.*

Professor KERR, on being called upon to reply, said he had no need, especially at that late hour of the evening, to claim any right of reply; but if the meeting desired it, he would offer a few observations upon two or three points of importance which had been raised by the several speakers. First, as regarded the remark of Professor Donaldson, that he would require to devise some simpler diagram before he could satisfy a judge, and that of Mr. Newton to the same effect as to satisfying a jury, he must simply say that to satisfy a jury upon any question of the kind was a thing not to be expected; and even to satisfy a judge by a diagram could scarcely be expected, because neither jurymen nor judge, nor even the lawyers, however intelligent, could be asked to go so much into detail; but if architects could satisfy each other, both judges and juries would be satisfied. It was easy to say at hap-hazard, simplify the diagram; but there was, in his opinion, no necessity for simplifying it. If the diagram was as simple as the question itself, no more could be hoped for. That evening's discussion had proved how very far from simple the question was; and for his part he was very well pleased to be able to offer any diagram at all as a test of proof in so complex a matter, and the only argument he could entertain was, not whether it was easy to work, but whether it was correct. His friend, Professor Donaldson, had then entered largely into arguments upon the law. Now they all knew that mere law arguments at the hands of surveyors must be quite unavailing, and in this case especially it would be, in his opinion, vain for that meeting to attempt to determine any questions of law. [Mr. DONALDSON: I stated the law; but I argued only upon the equity of the law.] He (Professor Kerr) still thought it was in vain for them to give any decided opinion upon details of law. As architects, they were obviously unable to command respect upon merely legal ground; it was only by acting upon ground of their own that they might effect some good. He himself had avoided the legal question; he professed to be, not a lawyer, but a measurer of window lighting, and if he could accomplish accurate measurement he was making himself much more useful than if he were interfering with the law. Several gentlemen had argued as if the Prescription Act of William IV. were a new measure, which was a great mistake; for it merely reduced to the definite term of twenty years that indefinite term of possession which previously had been called time out of mind. It made no alteration in the principle of law—this had always been the same from remote antiquity. Even with the Romans this principle had been the law; indeed so closely was it then argued that a distinction was made between the rule of light for towns and that for the country; in fact, the

* RAND v. COOK (*Extracts from Newspaper Reports*).—The Chief Baron in summing up said: " * * * It was not the law that a man who had enjoyed a certain amount of light should go on enjoying that amount of light for ever. Society was so constituted that there must be give and take always going on. Some people no doubt wished to make it all take and no give. * * * Suppose the owner of property on one side of a road build a cottage, was the owner of property on the other side to be stopped from building a similar cottage? To say that a man who lived on one side of a road, was able to forbid his neighbour on the opposite side to build a wall, was monstrous, and in all his professional experience, extending over half a century, he had never known such an action brought. * * *

principle in question had been the law of the civilised world from time out of reckoning, and from all he had seen and read about it he was afraid they would not be able now to alter it. As to the City of London rule, it might be sufficient to remark that it was only received as a matter of custom. [Mr. ASHPITEL remarked that it utterly failed to hold good upon investigation.] That was very likely. He would next desire to point out to Professor Donaldson that all those arguments which he had based upon questions of special grievance on one side or on the other were ineffective in this way, that as every consideration of the kind was matter of equity, it was competent for counsel, and indeed for skilled witnesses, to introduce to the notice of the Court whatever might be deemed desirable in that way, according to the circumstances of the case. [Mr. DONALDSON: Not against the positive law.] The positive law, as his friend called it, established no more than a sort of general principle to be applied by the courts of equity according to the circumstances of each particular case. They were at liberty to argue to any extent (for instance, architects did so in their affidavits) upon whatever circumstances might arise, and the judge would pay due attention to those arguments. Again, to return to the Prescription Act—as regarded the term of twenty years itself, it must not be forgotten that twenty years' possession of a thing was a very weighty argument in whatever case; even in matters of landed property twenty years' possession was held to create in a certain sense a freehold; and in this particular matter twenty years' undisturbed possession was practically a very long possession, and not a thing of yesterday, as some of his friends appeared to argue. Mr. Bell had made some observations which were at least pointed. That gentleman would have preferred that he had made his diagram to apply in some way inside the room rather than outside. He had no particular objection to this, but he could only draw the same half hemisphere (as a reflection) inside that he drew (as a thing reflected) outside, and the result would be precisely the same. But the fact was that Mr. Bell was there as the advocate of the old system of rule of thumb, and nothing more; and he would show the meeting the real difference between Mr. Bell's ideas and his own. It happened a short time ago that Mr. Bell and himself were engaged on the same case and on the same side. It was a case of a building of Mr. Bell's, and he of course had charge of its defence. The measurement system was applied by Mr. Ashpitel and himself with perfect success—a better case of defence there never was; but Mr. Bell persisted in referring to more “direct” evidence, such as setting up a tarpaulin and dropping it suddenly; he also insisted upon arguing about peculiar North lighting, the shade of coffee berries, and so forth, and what was the result? The judge, on Mr. Bell's own evidence, gave a decision against him. [Mr. BELL dissented: the decision was only an interim injunction, and the case was to go to a hearing.] He certainly was never more astonished in his life than when he read in the newspaper the decision of the Court in that case. There could not possibly be a clearer case by the test of admeasurement. He held in his hand the diagrams he had made, and as an illustration he might say that in the particular case of the window specially referred to by the judge, the light formerly possessed was actually (68 measures at 45 being the standard of necessity) not less than 211 measures, and the proposed abstraction 15½! And yet the Court felt obliged, on Mr. Bell's own evidence, to grant an interim injunction. All he could now say was that if the judge, instead of fixing his attention upon Mr. Bell's tarpaulin, had been allowed to pay more attention to the evidence of admeasurement, the case would have gone very differently.* [Mr. BELL: It will be all right yet.] He hoped it would; but on the whole he thought Mr. Bell was the last man who ought to cast disparagement upon admeasurement, and he might depend upon it, as regarded the case in question, he would have to fall back upon it in the

* I have been since reminded that the evidence of Mr. Ashpitel and myself, as drawn by ourselves, was mutilated by the omission of the results of our admeasurement, in pursuance of some maxim of legal expediency. This in my opinion explains all.
R. K.

end. To go now to another subject, he would say that a very great deal of the argument which had been used throughout the evening might be answered in one word—it all referred to exceptional cases, and he had clearly laid down the principle that exceptional cases could only be treated exceptionally. It occurred to him in the next place that Mr. Hesketh, a gentleman of great eminence in the profession, and of wide experience in cases of light, had used to him privately an argument which had not been brought forward that evening. So far as it went it seemed very plausible. Mr. Hesketh, admitting the measurement system as a principle, said there was one refinement, however, which had not been allowed for, inasmuch that the light which entered from the front penetrated further into the room than the light which entered from the side, and therefore, said he, allowance must be made for this fact. But the answer was that anything of the kind would be only a needless refinement, even if it had any considerable effect upon results, which it would not. As time pressed, he must now ask leave to pass over a great deal of the minor incidents in the discussion, and turn attention to that important question, how to effect, not an alteration of the legal principle (for that, he thought, was beyond their province as architects), but an amendment of its practical administration. Here he had several specific propositions to submit. The first was, that all these cases of light were matter for practical men to adjudicate upon under the special circumstances of the occasion, and not mere abstract problems for lawyers to argue *à priori*. This was, in fact, one of the chief ideas stated originally in his own paper, and he thought it would be well to introduce a rule to operate in all these cases, viz., *Reference to a Surveyor, by order of the Court*, just as the law courts refer cases of disputed accounts to the Master or to an arbitrator. Another point to which attention might be turned was this—how far all these difficulties might be surmounted by admitting a principle of re-adjustment. For instance, if a neighbour had a window opening out upon another's property, and if because it was a small window he required a large amount of sky surface for sufficient lighting, why should he not be asked to enlarge the window and let less sky surface suffice? The Court would reply that it could not compel him so to re-adjust his light, because he might suffer damage in some other way. But, granting this, he would still urge the principle, and call it *Re-adjustment plus damages*. Thirdly, there was an idea which would provide an answer for a great deal of the complaint which had been made by various speakers. It was argued that they had no means of preventing these easements of light from being established, and that that was a weak point in the law. To meet this he would suggest the principle of *Reservation by Protest*, so that, whenever an easement of light was established over a neighbour's property, it should be competent for the neighbour to reserve all his rights by some notification to that effect. As regarded the French law, which Professor Donaldson had laid before them, and which was new to him (Professor Kerr), he was sorry to say he did not see how that would help them in England, because it did not touch (as he understood its application) the real question of light, but merely that of overlooking another's land. In conclusion, he was much gratified to find that his paper had been the means of raising so much discussion upon so important a matter. As for himself, he would repeat that he professed nothing more than the measurement of the light, and he thought it would be better if other gentlemen present, instead of talking law, would leave law to the lawyers and turn their attention, as surveyors, to surveyors' proofs, whether by his own system or any other; for he must be allowed to maintain that no one ought to expect his opinion as a scientific expert to be attended to, unless he was able to produce scientific reasons upon which that opinion was founded.

Mr. DONALDSON remarked that his friend Mr. Ashpitel had said the question depended upon the practice of architects rather than upon the law; but the practice of architects must be guided by law; therefore he had enquired into what the law was, and his aim had been to lay before the meeting the

present state of the law as ascertained from the cases recently given, and the last case, by far the most important, summed up the different points of the law in a very comprehensive manner. He wished to shew what the law did or did not allow, in order that they might design their buildings accordingly, and not, through inadvertence, lead their clients into error, by supposing that they could establish a right which the law did not recognize.

Mr. ASHPITEL said his friend misunderstood him. His wish was, not that they should go into Court to test the law, but that they should be able to go and state certain facts, measurements and proportions, relative to which he thought Professor Kerr's plan was a good one.

Mr. DONALDSON added, there was one point in particular—that was, as to extent to which a right had been used. But there were two sorts of rights, the rights of the tenant and the rights of the owner. It might not be necessary for the purposes of the tenant to avail himself to the fullest extent of the easement belonging to the premises he occupied; but if the owner proved a diminution of light, which, though it did not affect the immediate tenant, reduced the value of the property, he had a right to stop that diminution of the value of his property. This was laid down absolutely in the cases he had cited.

Mr. ASHPITEL said he had stated that when the building he referred to was used as a malt house there was light enough for the purposes of malting, and no more; but when the character of the building was altered, and the owner wanted more light, the law stepped in and said: "Your prescriptive right has always been so much light as will suffice for the manufacture of malt, and you have no right to demand as much light as would be required for any other business, say for watch-making," Of course these rights must have been held without challenge for twenty years, or if suspended for any cause during this time, such non-user or suspension must have been for less than a year and a day.

The Chairman, Mr. J. SPENCER-BELL, Fellow, said the result of the discussion appeared to him to shew that the whole question was in great uncertainty as to the law, the equity, and the facts, and he was not able himself to admit the equity of the law that a right should be inherent in certain properties by hap-hazard; and that it was by mere accident that a wide street ever had two sides to it, because, according to the way in which the law had been laid down, if a house was built 10 feet high on one side, and another house was built on the other side, 40 feet high, it was impossible to raise the 10 feet house after the lapse of twenty years. It was a mere accident whether after twenty years a man had a right to use his own property, and if that were the law he could not see the equity of the thing. He dissented from Mr. Ashpitel that law and equity were synonymous terms.

Mr. ASHPITEL—But they ought to be.

The Meeting then adjourned.

In a paper which Mr. W. WHITE, Fellow, intended to have read at the closing meeting, held on Monday, June 18th,—but which was postponed on account of the extraordinary length of the previous business of the meeting,—the author thought he would be able conclusively to show that Professor Kerr had not sufficiently recognized the true bearings and importance of reflected light. Mr. White finds practically, and professes to prove, that the increased nearness or increased height of an obstruction, with only the same amount of obscuration of sky surface, is a practical result such as materially to modify decisions based upon the measurement of sky surface alone; and hence he concludes, that whether judges and juries will recognize the element of reflection or not, it is but right that the state of the case should at the least be represented to them. He points out that this is quite irrespective of the question of the accidental colour of the obstruction, though this of course might, as the Professor observes, have sometimes a material influence on a given result, if its influence were allowable.

Mr. White corroborates his views by reference to several obvious facts, and proposes to take up the subject on some future opportunity.

SOME REMARKS ON THE MEDIAEVAL ANTIQUITIES OF THE
COUNTY OF DURHAM.

BY J. TAVENOR PERRY, Associate.

Read at the Ordinary General Meeting of the Royal Institute of British Architects, June 4th, 1866.

Mr. PRESIDENT AND GENTLEMEN,

IN accordance with the request of the Secretaries, I have the honour to read before you this evening a paper on the Mediæval Antiquities of the County Palatine of Durham; more particularly on those I visited or sketched last year, while holding the Pugin Travelling Studentship. I felt, at first, somewhat unwilling to do so, as the request was unexpected; for I had no idea while preparing the drawings, and making the few notes I have, that they would be required for any other purpose than my own instruction. Anxious, however, to make my work as complete as possible, I have endeavoured to comply with their wishes, and I must therefore trust to your kindness to receive such accounts as I can give, with the consideration due rather to a student than a member of this Institute.

The short time I had at my disposal—about nine weeks—was almost entirely spent in measuring the most interesting remains in the county least known, and hitherto unillustrated in this manner; and, although I was necessarily compelled to leave many examples untouched, I succeeded in getting drawings of the most beautiful, or most characteristic, of the various building periods of the diocese. The drawings I have arranged, as far as I could, in chronological order, and I propose to treat the subject historically, giving short notices of the various bishops, so far as they are connected with the periods and buildings under consideration.

The earlier history of the diocese, and its connection with S. Cuthbert, are too well known, and are also too remote, to require repetition now; but the existence of the church of Chester-le-Street, on the site of one of S. Cuthbert's resting-places, as well as the remains in the towers of Norton, Billingham, Monkwearmouth, &c., and the relics preserved in the Chapter Library at Durham, are interesting memorials of pre-Norman times. Most of the ecclesiastical buildings of the county, whether they were raised on a Saxon foundation or not, show that the time immediately following the Conquest was the great building age of the diocese; and from the cathedral itself, down to the smaller parish churches, nearly all have considerable remains of the work of this epoch.

The unruly state of the people after their first conquest by the Normans, as shown in 1080 by their murder at Gateshead of Bishop Walcher, gave cause to William to treat the province with great severity, so that in the frequent devastations to which it was subjected, the various edifices raised by the Saxons became ruins, and their complete rebuilding was thus necessitated. The building which would naturally receive the first attention from such a king was the castle, and the present one was founded by his direction in a magnificent position overlooking the cathedral and the river. In all probability it was raised on the site of an earlier one which had been destroyed in the previous troubles. Little of this castle of William's, however, remains, unless it be the crypt, as it is now called, of the castle chapel. This is sometimes ascribed to Bishop Carileph (1080-1089), the second Norman bishop of the diocese, under whose care the works had been carried on; and the early profile of the bases and rude carving of the capitals quite accord with this date. Such of it as is left is shown in the drawing, and consists of three aisles of nearly equal width, of which four bays remain, vaulted with a plain Roman vault. At the east end, where the wall has not been cut away for a modern staircase, are remains of

two altars; and a considerable part of the floor is of the same date. Beside this, unless it be in the foundations, nothing else in the castle appears to belong to this period; but the same bishop commenced to rebuild the cathedral, and the plan, as it now is, differs but little from his design. Soon after his consecration he obtained a bull, giving him power to eject the secular clergy, who had until that time lived in the convent, and to introduce some monks of the Benedictine order. For some years, however, he was unable to carry out his design of rebuilding the church, being forced to absent himself from his diocese in consequence of his having incurred the king's displeasure, by taking a part in the unfortunate quarrels between William Rufus and his brother Robert. In 1093, the destruction of the Saxon cathedral, which had been scarcely built a hundred years, was commenced, and the new church begun according to his designs. As he died, however, in 1095, little was done under his direction beyond raising the walls of the choir a few feet above the ground. But his successor, Ralph Flambard (1099-1128), was well able to carry into effect the designs of Carileph. Originally a village priest in Bayeux, he had risen and flourished with the conquerors, and had succeeded by fraud or favour in obtaining some of the highest offices in the country. He purchased the bishopric of Durham for a thousand pounds, and took possession of his see in 1099. He had already been occupied in building; for at Christchurch, of which he was the dean, he had completed the nave and transepts, and was meditating the addition of a new choir when he removed to Durham. The great similarity between these two churches has been already pointed out in a paper read here by Mr. Ferrey two or three sessions ago, in which he gives a full account of the bishop's life and works. Under his superintendence the walls of the cathedral were carried up to the springing of the groining, and the lower stages of the western towers built. In his episcopate, Finchale was added to the priory, and the foundation and dedication of the hospital of St. Egidius, at Kepyner, are due to him. The beautiful bridge of two arches, spanning the river on the north of the cathedral from Framwellgate to the castle, was also one of his works, although it has at a later date undergone considerable alterations. The next bishop, Galfrid Rufus (1133-40), was the builder of the Chapter House, of which unhappily but little remains to the present time. When completed, it formed a vaulted chamber, eighty feet long by thirty-five wide, having an apse at the east end. The west end—which is all that is left of this beautiful work—consists of a doorway from the cloisters, under a richly moulded arch of three orders, between windows of two lights on either side. Such of the carving as still remains untouched is exceedingly curious and elegant in design, and presents good examples of the ornament so peculiarly characteristic of this style. The walls were decorated with an interlacing arcade, similar to that round the aisles of the cathedral, and the vaulting ribs of the east end were carried on enormous corbels representing atlantes. Of these, only three remain, in a very dilapidated condition, preserved, with many other relics of former times, in the chapter library on the west of the cloisters. Many bishops from Flambard downwards were buried here, and the floor was covered with memorial brasses; but in 1799, owing to the room not being considered comfortable enough for chapter meetings, the greater part of it was deliberately destroyed, the key-stone of the vault was knocked out, and the whole mass of the stone roof fell in upon the monuments beneath, without a single effort being made to rescue even so much as the bishop's chair from the general ruin. In Carter's drawings of Durham, the chapter house is illustrated, and there are fortunately remaining in the library some sketches of his, showing the state of the building before its destruction. The only part allowed to stand, was the west end I have described, shown on the measured drawing, which affords a good specimen of the character of the work we have lost. To Rufus succeeded two bishops, who held the see but for short periods, and contributed but little towards the advancement of the works already in progress. In 1154, Hugh Pudsey, a nephew of King Stephen's, obtained the bishopric at the age of twenty-five years; and then

while on the old Norman jambs of the porch a high pointed arch was raised, and the Norman hood mould was rejointed and made to fit the inner arch of the porch: thus the whole of the door remains, but in three different parts of the church. About 1190 very considerable alterations went on: the nave was removed and entirely rebuilt by Pudsey, with arcades of pointed arches, enriched with the usual dentil ornament so characteristic of his time. The chancel was added a little after his death, and has a well-proportioned triplet at its east end.

It was in the port of Hartlepool, afterwards the great port of the Palatinate, that Pudsey prepared his fleet to sail for the Crusades. From this undertaking, however, he was dissuaded by Richard the First, who was not a little jealous of the splendour of his arrangements, and he was induced, by additional grants of power to remain at home and transfer his retinue to the service of the King. This is one of the first events recorded of the place, where, afterwards, one of the finest churches we owe to Pudsey was erected. From the earliest times Hartlepool had been the seat of important religious houses, a convent, of which St. Hilda was the second abbess, having been founded here in the middle of the seventh century. The present church, dedicated to St. Hilda's memory, belonged to the Black Friars, but all remains of the convent have perished. The church itself, though it has suffered severely—tradition says, through its connection with the Bruces, who built the chancel—is still one of the finest in the south of the diocese, and for its fine proportions and simple arrangements must hold a high position in the architecture of the country. As it now stands, it consists of a nave of six bays, with north and south aisles, portions of two bays of a chancel, also with aisles, and a fine western tower, with chapels between the buttresses. The greater part of the chancel was pulled down during the last century; but it is said to have been, when perfect, of the same length as the nave. As at Lanchester, there had been here, previously, a church of earlier foundation, as shown by the door still remaining in the wall of the south aisle, highly enriched with zigzag ornament; but, with this single exception, nothing remains of a date anterior to 1185. In this year, or thereabouts, the nave and chancel were erected, and form one of the most successful works of the period. The nave arcades have a fine series of arches, on piers of very varied designs, formed sometimes of clustered shafts, with moulded capitals and circular abaci. The aisles are crossed with stone arches from each pier to the wall; those on the north side springing from a lower level than the top of the capitals. The clerestory consists of single lancets in each bay, united outside by a very rich wall arcade. The roof was designed to be of wood, the principals being carried on wall shafts rising from the piers below; but these, and the roof itself, have in many cases disappeared. The present roof was erected during the last century, when also the east end was disfigured with a window of most horrible design. The chancel, though more ornamental in the details, has the same general arrangement as the nave, and is separated from it by a gloriously moulded arch of most noble proportions. One peculiarity of this arch consists in its having a small cap to one of the shafts in each pier, a little below the springing, to receive the ends of the rood-beam.

The tower at the west end of the church was erected some forty years later than the rest of the work, in the pure first Pointed style, and is very peculiar for the enormous projection of its buttresses and the buildings between them. It has long formed a puzzle for archæologists; and the object of the various alterations it underwent while building, is by no means fairly accounted for yet. By some it is supposed to have been originally intended for a central tower, and this appears to be by far the most sensible theory, since the great piers of clustered shafts show in the angles both inside and out; but the failure of the foundation, or the want of sufficient funds, prevented the extension of the nave westward. The plan having been abandoned after the tower had been built for a cross church, the great buttresses were required to strengthen a tower vaulted at so great a height, without transepts or nave

against it to give it support. On the south, between the buttresses, is a small chapel, entered through a shoulder arch in a wall which has evidently been the filling in of a larger arch of the same date. On the west front, and the side against the church, however, the great arches of the lower chamber of the tower were not filled in until the fifteenth century. Whether or not there was ever a large western porch and parvise over it is impossible to say, although of the former there are some indications as well as entrances on the north and south sides; but the buttresses, at the height of a few feet from the ground, bear no marks to show that there have ever been walls or roofs abutting against them. The lower chamber is groined at a height of thirty-five feet above the ground, and has a large hole left in the filling in, for lifting the bells through into the belfry. Many of the upper windows were walled up immediately after the completion of the tower, with smaller windows left in the new work, a proceeding which, as it threw much greater weight on the foundations, did not at all tend to strengthen the work. The stone employed in its construction is the magnesian limestone found in the neighbourhood. All is now in a most ruinous condition, the tower considerably out of the upright, and the windows, where not altogether stopped up, fitted with common sashes: while inside dirt, and pews in their most vicious forms, reign supreme; and within the memory of many still resident in Hartlepool the north chancel aisle was used as a powder magazine.

One year before the death of Pudsey, his son Henry founded the priory church of S. Godrick at Finchale. Complete drawings of this beautiful work were, however, exhibited here a few weeks since, and I will not trouble you with any account of the buildings.

Another of the churches attributed to the zeal of Bishop Pudsey is that of S. Cuthbert, Darlington. That Pudsey was its architect appears, however, scarcely possible, as the general style is much more advanced than the rest of his work; and it could scarcely have been built before the year 1200. But there are many portions of the work distinctly of the same character, as much of the latter work in St. Hilda's, and other transitional churches; and it would appear that, although in Pudsey's time nothing more was done than the commencement of the foundations, much of the stone he had provided, and which had been partially worked and was used up after his death, when the building was proceeded with by his successors.

But public buildings and churches are not the only memorials of this bishop's life and rule; for the chapter library contains some most splendid manuscripts written by his orders, and presented by him to the convent. Among these is a work of four volumes, still in its original binding of stamped leather, known as "Pudsey's Bible," containing many pages of the richest illumination. The one shewn on the drawing is exceedingly interesting, as the arcaded work surrounding a page from the Eusebian canons represents the wall arcading of the cathedral, and since the manuscript was written within the convent it is more than probable that the original colours were imitated as well as the form. Another manuscript which came into the library about the same time, although it appears to be of a slightly earlier date, is a treatise by Berengarius on the Apocalypse, containing a few most choice specimens of illumination. Both for softness of colour, and fine drawing, this is rarely surpassed: the copy I have made of the initial letter to the volume, will give you some idea of the beauty and peculiar character of the rest.

Pudsey died in 1195, and his immediate successors were too much engaged in quarrels with King John to attend sufficiently to the affairs of their diocese. But in 1227, Richard Poor was translated to Durham from Salisbury, where he had already been seven years at work on the new cathedral. He pulled down the apse at the east end, which had become very dangerous from its ruined condition, and commenced the chapel of the nine altars, in 1235, in the perfect first Pointed style. It was in this episcopate that the tower of Hartlepool and the greater part of Darlington were completed; while

throughout the diocese, there were many churches and buildings erected under his influence, either during his life, or immediately after his death; among which may be mentioned SS. Mary and Cuthbert, Chester-le-Street; S. Mary Magdalen, Medomsley; S. Nicholas, Boldon; S. Cuthbert, Billingham; and others. S. Cuthbert, Billingham, had been founded many years before this time, and contains, as well as the church of the adjoining parish of Norton, very considerable remains of pre-Norman work. The belfry stage has windows of two lights, divided by a plain baluster shaft and a star-shaped opening pierced in the head. The nave and chancel were, however, built in the beginning of the thirteenth century, and the arcade on the south side presents some rather unusual features. The shafts are clustered, but the abaci are invariably square, although the capitals are not carved. The font, too, is worth attention, as the shaft on which it stands swells slightly above and below the centre band, but it has suffered considerably from re-tooling in a recent alteration. S. Nicholas, Boldon, a small church consisting of a nave, aisles, chancel, south porch, and western tower and spire, is almost entirely of this period. It was altered, shortly after its building, by extending the aisles westward, so as to enclose the north and south sides of the tower, which, before, was only connected with the church on its east side. The upper stage of the tower, however, and the spire remain intact, and in spite of stunted proportions necessitated by its exposed situation the general appearance is very good. The crosses at the gable ends of the nave and chancel are among the best designed in the county, and belong to the same period as the rest of the church. The porch and bells are of a later date; the former is covered by a stone roof, supported on stone ribs, and belongs to the fifteenth century; and the latter, to the sixteenth. Much of the Church of S. Michael, Houghton-le-Spring, is of this date, although it contains examples of nearly every period of mediæval art. The earliest remaining portion is a tympanum to a small north door in the chancel, built into a wall of the thirteenth century, and seemingly of Saxon work, and curiously carved all over with scaly monsters entwined. The transepts contain some good early windows of two lights, with quartre-foil over, one of which is given in the drawings, and the nave has some of the best second Pointed windows in the diocese.

S. Mary Magdalen, Medomsley—a chapelry of the mother church of Lanchester—is built on the hills overlooking the Derwent, in a most bleak and unsheltered situation. Accordingly we find it suited to its position, with roofs of low pitch, no windows—except modern and unnecessary ones—in the whole length of its north wall, and only a small bell-cot on its west gable. It is generally complete in its style, although there appear to be indications of Norman work, due, however, possibly, to the rudeness of the design. Such mouldings as there are in the chancel, shew great taste and refinement; but the awkwardness of the shafts between the lancet windows, supporting nothing but the hoodmoulds of the triplet, indicates either some change in the design before its completion, or some later alteration of the work. The church now consists of a nave and chancel of equal width, and without aisles, divided at about one-third their length from the east by a well moulded chancel arch carried on corbels. All is in a very dilapidated condition, the one attempt at restoration having been the conversion of the piscina into a font!

The Church of Holy Cross, Ryton, is another of the buildings of this period. The village is most charmingly situated, about seven miles west of Newcastle, on the steep south bank of the Tyne, which is thickly covered with wood almost from the river's edge. The church has a nave with north and south aisles, chancel, south porch, and western tower and spire, and is mainly of first Pointed work, the chief exceptions being the upper parts of the nave, and several windows of the fifteenth century. The chancel has some well-proportioned lancets and buttresses between, boldly chamfered and stopped with curiously carved heads. The interior is now sadly mutilated, and from the plaster casts and wood carving of doubtful propriety with which it is adorned, it appears to have formed for some time

past a sort of museum. The most interesting part, however, is the spire—108 feet high—which still retains its original timber framing, but little interfered with by modern additions, and forming one of the best preserved pieces of mediæval carpentry existing in the diocese.

Another of this series of churches is S. Edmund, Sedgefield, which contains some very choice examples of this style in the arcades of its nave, although the greater part of the building is of a slightly subsequent date. The plan will show its present arrangement, and the details will afford some idea of the general superiority of this work to that found generally in the diocese: in delicacy of carving and richness of design it can only be compared to some of the best to be found in the Chapel of the Nine Altars. The clustering of the shafts and the arrangement of the bands are particularly noticeable.

The memory of the immediate successors of Bishop Poor is not particularly connected with any building operations, except that of Bishop Farnham (1241-49), who is said to have erected the lower part of the lantern at the crossing of the cathedral. But in 1283 Anthony Bec, secretary to King Edward I., was appointed to the See, and did more, perhaps, for his diocese in building and endowment than did any of his predecessors, with the single exception of Pudsey. His wealth and power were enormous, and he held among other honours the titles of King of Man and Patriarch of Jerusalem. The Church of All Saints, Lanchester, was made collegiate by him, and underwent some curious alterations to fit it for its new requirements. The chancel not being of sufficient width to receive the necessary stalls, but yet having been too well and recently built to be destroyed, two recesses, of the depth and length required, were sunk, the one in the north and the other in the south wall, and were boldly arched over below the eaves, so that the roof had not to be disturbed. Several new windows were also added at the east end, and that part of the church completed as we now find it. At the same time a new vestry was built on the north side, with a most beautifully carved door, trefoil headed towards the chancel, the tympanum of which has a figure of Our Lord in Session. At the north and south ends of the altar are series of heads projecting from the wall, as at Medomsley, for carrying lights.

The Collegiate Church of S. Andrew, Auckland, is another of the works attributed to Bishop Bec. It is cruciform, of noble proportions, having a lofty tower on its west front, and a porch and parvise on the south. For size it takes the first position in the county, being 170 feet long; but for decoration it is not so remarkable, depending as it does, for general effect, more on the beauty of its proportions and size of its parts than on the richness or delicacy of its details. The original windows having, in most instances, been found unsuitable for the requirements of the church, were filled in, and two light windows of almost the same character have been curiously inserted by their sides. Throughout the building are remains of several piscinas, aumbries, sedilia, &c., and in the chancel are some stalls of good Perpendicular work, similar to those at Darlington. The porch and parvise are peculiar, the former being vaulted and having the cross ribs semicircular, while the ogives are segmental. The staircase to the parvise is on the south side of the porch in the angle next the church, from which it is entered. On the north side, next the door, is a niche for the stoup, with a plain circular head, and there are provisions on each side to receive the wooden seats. Of Kepy Hospital little now remains: the entrance gateway, however, which would appear to have been built about this time or a little later, has been preserved, having an archway groined in two chambers, separated by an inner arch, with a room above.

Bishop Bec died in 1311, and but little was done for some years afterwards to continue his works, for the Scotch wars rendered the diocese scarcely habitable, and the wealth of S. Cuthbert was expended in the defence rather than in the extension of his patrimony. Bishop Hatfield (1345-81), however, found time and opportunity to carry out considerable additions to the castle, and in his episcopate, John Lord Neville presented the magnificent altar screen to the cathedral. This was made of Caen stone

carved in London, and brought down to Hartlepool by ship, as was also the beautiful tomb now standing in the south aisle of the nave. The tomb stood originally in a chantry near, founded by the same Lord Neville, and was made by his orders, before his death, for himself and his wife. The effigies are of alabaster, but nothing of them remains except two almost shapeless masses; while the tomb itself is of Caen stone, wrought all round with beautifully designed niches, each containing a statue of one of their children. Lord Neville died in 1386, so that this tomb was made a year or two before. At Staindrop there is another fine tomb belonging to one of this family, and in the chancel of the church of S. Brandon at Brancepeth, is an effigy of one of the Nevilles, cross-legged and colossal in size, but of a considerably earlier date. In this church is also a very good oak chest, richly panelled and carved, and apparently of about the end of the fourteenth century. The front is formed of three boards framed into upright pieces at the ends worked into panels containing most wonderful grotesques.

Walter Skirlaw, who obtained the bishopric in 1388, built the cloisters of the cathedral, and completed the tower of Chester-le-Street by the addition of a magnificent spire. The lower part of the tower was Early English; on this was raised another story, octagonal in plan, above which was built a spire 156 feet high, one of the loftiest in the district, which is singularly deficient in such buildings. Cardinal Langley succeeded Skirlaw in 1406, and issued a commission to inquire into the state of the various churches of the diocese, many of which were found to be in a most dilapidated condition. Lanchester appears to have been one of the worst, and the clerestory and western tower had to be entirely rebuilt. Considerable additions were also made to the Galilee, the external walls and roof being in a great measure rebuilt, and two more shafts, with caps, bases, and mouldings exactly imitated from the original Norman work, being added to each of the piers. Langley also erected a chantry for himself in the Galilee, against the west door of the cathedral, but this was removed a few years since.

From this time the history of the diocese is one of architectural decay and desolation: the monuments of antiquity were treated with indifference and neglect, and in the troubles which afterwards brought about a better state of things, much that was beautiful and grand became irreparably ruined or lost. By the munificence of Bishop Cosin, in the seventeenth century, some attempt was made to revive the taste of former times. The cathedral was restalled throughout, in a manner far superior to that in fashion at the time; and the churches of Brancepeth and Sedgefield are full of stall work and screens of the same character. In spite, however, of neglect, not peculiar, unfortunately, to Durham, there still remains an abundance of most beautiful work throughout the county, of which it would be impossible in a short paper like this, or by means of drawings made in a few weeks, to give more than an idea. I trust, however, that the little I have said will be sufficient to show that although Durham is one of the least generally known of the architectural provinces of the country, this, though a great charm, is by no means its only one.

In conclusion, allow me to express a hope that some gentleman here may be induced to search out the materials for a more complete history of the life of Bishop Pudsey. Living, as he did, through the whole period of the great transition, further accounts of him would be invaluable, and might tend to throw considerable light on that interesting time. On the south side of one of the altars in the Galilee is the portrait of a bishop, in the act of blessing, traditionally said to be his, and the decorations surrounding it are clearly of his time. If this tradition be true, and there is nothing to be urged against it, we may congratulate ourselves on having a cotemporary likeness of this great man, which would form a valuable addition to such an account as I suggest. The tale of his life is the history of the great change from the massiveness of the Romanesque style to the lightness and elegance of First Pointed; and Durham was particularly fortunate, at such a season, in having a bishop, who, uniting the refinement of an artist to the power and influence of a position scarcely less than royal, was so well able to direct the

energies of its builders. While the works he carried out, at the beginning of his rule, show all the richness and solidity of the Norman style, and the last are almost perfected specimens of Early English, through the whole series there runs some connecting link of likeness, in the carving of a cap, or the ornament of a moulding, to point out Pudsey as its author. Certainly no bishop left his mark more distinctly on the age than did he; and the gloriously illuminated munuscripts with which he enriched the convent library, as well as the fine churches which his wealth and diligence erected throughout the province, show both the purity and the excellence of his taste.

The CHAIRMAN, Professor T. HAYTER LEWIS, V. P., said it afforded him great pleasure to preside on the occasion of the reading for the first time of a paper by his late excellent pupil and now good friend, Mr. Tavenor Perry. He would go so far as to say that if all students who gained prizes, made as good use of their nine weeks' tour as Mr. Perry had done, they might in future expect some excellent papers from them. He would add, that of all the architects, or patrons of architecture, who had existed in this country, none had been more energetic than he to whom Mr. Perry had so much alluded in his paper, viz., Bishop Pudsey, and a detailed examination into the history of his life and works would be most interesting and instructive. For in him they had a man beginning with the style only prevalent in his early days, and carrying it through a stage of transition up to something like an entirely new style. The *modus operandi* of this would be a very interesting subject, and one which was still but very little understood. He saw several gentlemen present who were well competent to discuss Mr. Perry's paper, and he should now be happy to hear the remarks which they had to offer.

Mr. WYATT PAPWORTH (responding to the invitation of the Chairman) said he must take up his old ground as regarded the Bishops having acted as architects, and express his doubts whether Bishop Pudsey could be classed as one of the profession, especially as the names were now known of two persons who were most probably his architects;* but he had not given any particular study to the life of the prelate. He begged to state that he was somewhat disappointed in the paper just read, as he had anticipated that it would have been descriptive of Mr. Perry's tour and of his investigations, which he considered would have been more in accordance with the conditions of the Pugin Memorial Fund.

Mr. JOHN P. SEDDON (Hon Sec.) said the description of the tour had been already deposited with the Institute, and the paper read this evening was an additional contribution on the part of Mr. Tavenor Perry.

Mr. WYATT PAPWORTH regretted that he should have misconceived the object of the paper, and added that the number of drawings by which the paper was illustrated displayed a great amount of industry, and he hoped that the exhibition of them this evening would be an incentive to future students under this fund, to make their tours equally interesting and instructive with that by Mr. Perry.

Mr. J. H. PARKER said he was hardly sufficiently acquainted with the part of the country alluded to, to be able to say much on the subject brought before them this evening. He thought it was very gratifying to have such a paper, and if others would follow in the same direction it would be a great advantage to the Institute. He thought that to take up the works of such a man as Bishop Pudsey would be most desirable, and nothing was more wanted than a good series of monographs of particular Bishops, whether they worked as architects or carried out any great works systematically. He had long projected a chronological series of the principal architectural works of each of the Bishops known as builders. He began with Bishop Gundulph, of Rochester, in the eleventh century, but from his other avocations

* See Richard of Wolveston, a "prudens architectus," in the paper "On the Superintendents of English Buildings," read December 1861, p. 53.

and his long illness he had been unable to follow it up. He should be glad if different members of the Institute would work out the several periods, more especially the period of transition. Durham was perhaps one of our best counties for this purpose, but he thought Lincoln was the most important of all, as he thought the architecture of that county was in advance of that of any other country in Europe; at the period of the introduction of Gothic architecture, in the time of Henry II. and Richard I., the people of Lincoln, he believed, erected the earliest and one of the finest Gothic buildings in the world. The idea of Professor Willis that the Cathedral of Lincoln was French architecture, was not borne out by examination; it was the work of the Lincoln school of architecture entirely. He (Mr. Parker) could find nothing French in it, and the same conclusion had been come to as the result of examination by the most eminent architects of France. He had traced out the architectural history of St. Hugh entirely, from his birth to his death. Another might be met with at Durham, and there was William, the Englishman, at Canterbury, who, he suspected, was the architect of Rochester Cathedral. It was of great interest to trace out the career of these persons, where they came from, where they went to, what works they executed, and where they ended their career; and nothing would tend to furnish the real history of architecture so much as a well prepared series of monographs. He thought for the production of a young man, the paper of Mr. Tavenor Perry was an exceedingly creditable one.

Mr. WM. WHITE only wished to express his gratification that the first Pugin Exhibition Studentship had been so successful as it appeared to have been in the person of Mr. Tavenor Perry, and it gave them great encouragement for the future. There might be some points open to criticism, both to the drawings submitted, and as to the kind of paper read, but he did not know where they could look for any to be quite free from criticism. He thought a most valuable suggestion was that made by the Chairman, as to the comparison of one work with another of the same period. He did not see, however, without these drawings before them for some time, and a careful study of them, how they could enter into the measurements and proportions, and see how far the different proportions of the different parts of the buildings either agreed together or varied one from the other; or how often the actual dimensions themselves were repeated in the different buildings. This was important, as showing the connection of one architect, or one set of architects or body of men, with another, inasmuch as he had found in many ancient buildings in the same neighbourhood that the same dimensions were found in several of the particulars, and the same proportion between the several parts. He thought this would help them more than anything to work out a further knowledge of the system of development, which they found in the old works; but he did not see how they were to make use of these illustrations for this purpose if the drawings were to be scattered, some in one place, some in another, and we were left without some means of collecting them together, either by copies, tracings, or other means, in order to get fully the connection of the different parts so classified that they might be referred to. As regarded Lincoln Cathedral, he thought that was one of those in which there were some signs of an apsidal termination, which had been rebuilt square,—in which case the original features might have been destroyed. He wanted to know whether the attention of the French architects who came to examine the cathedral, was specially directed to that which possibly might have tended, if anything did, to show its connection with French architecture.

Mr. J. H. PARKER said the east end was re-built. There was said to be the foundation of an apse, but an apse was no proof of French work. He had accompanied some of the most eminent French archæologists of the day to Lincoln, and they all agreed there was nothing whatever French about it. The detail of French architecture was very different from English architecture; but Professor Willis said Lincoln Cathedral must have been the work of French architects, because we had nothing equal to it in England at so early a period; having nothing in England of the same date it must be

French! but the French architects decided there was nothing French in it, and they had nothing like it in France of the same date, therefore they did not believe the date. His own opinion was that England was in advance of France. During the long and peaceful reign of Henry II. of England and Anjou, the great change in architecture took place, and we got a decided start of France. The date of Lincoln Cathedral rested on the best authority, because they had the life of the great Bishop Hugh, written by his own domestic chaplain. He found from good local authority that the family of Du Noyer, the name of the architect, came to England with the Conqueror, and was settled in Lincolnshire for a century before the cathedral was built. That was one of the cases in which they got points of interest for comparison. With regard to the use of the drawings before them by Mr. Perry, he would say he had been driven to employ photography very largely. They could obtain a dozen or twenty copies of a photograph at very moderate cost compared with engraving. As an old publisher, his experience was that to make an engraving pay at the usual price, they required a demand for 3,000 copies, but as in this Institute there would not be a demand for probably more than 300, they could not make that pay. He thought for a society of this kind it was useful to have drawings photographed, and as many copies as were required.

The CHAIRMAN said one interesting feature in connection with Lincoln Cathedral was that after a survey of that edifice, M. Viollet Le Duc declared that no part of it was French, but that the whole was purely English architecture in design and detail.

Mr. THOMAS MORRIS said as their time was limited it was desirable to keep (within some moderate latitude) to the subject of the paper. He wished to return to Mr. Tavenor Perry's lecture, and would speak in terms of the highest commendation of the manner in which that gentleman had inaugurated the duties, business and labours of the Pugin Memorial Studentship. He had shown great judgment in the selection of the county of Durham as the scene of his investigations. With them it was in a manner an aboriginal county; it was not so well known as it ought to be, but that defect might be remedied by such explorations as the present. It was richer in example of the earlier Mediæval English architecture than any other county, and some of those examples were very elegant; it carried the exemplification of that (the Anglo-Norman) style from its commencement to its close, and was worthy of studious attention.* He thought, should other gentlemen, following Mr. Tavenor Perry, select districts of great historical interest, and send their observations for the consideration of the Institute, it would bring those observations advantageously into one central channel, and if their stores were enriched with epitomes of those works, such a valuable and interesting stock of information would be obtained as would lead them all to attach great interest to the institution of the Pugin Travelling Studentship.

Mr. EDMUND SHARPE, as an early labourer in the field which Mr. Tavenor Perry had chosen for himself, would add his testimony to the able manner in which he had investigated the works of Bishop Pudsey, and the other works of the diocese of Durham. They could scarcely have a better proof of the worth of the studentship founded by Pugin. Perhaps if the investigations had been extended beyond the limits of Durham, and had included such contemporaneous buildings as Teignmouth Priory for instance, with which Bishop Pudsey was undoubtedly associated, the interest of the tour would have been increased. They had to thank the author of the paper, not only for the copious manner in which it was illustrated, but for the manner in which he had entered into the documentary

* Durham owes its unusual abundance of ancient work to the fact of having been very much in the conservative hands of the Church, as well as to the massive characteristics, termed by Doctor Johnson the "rocky solidity and indeterminate duration," of the memorials themselves.

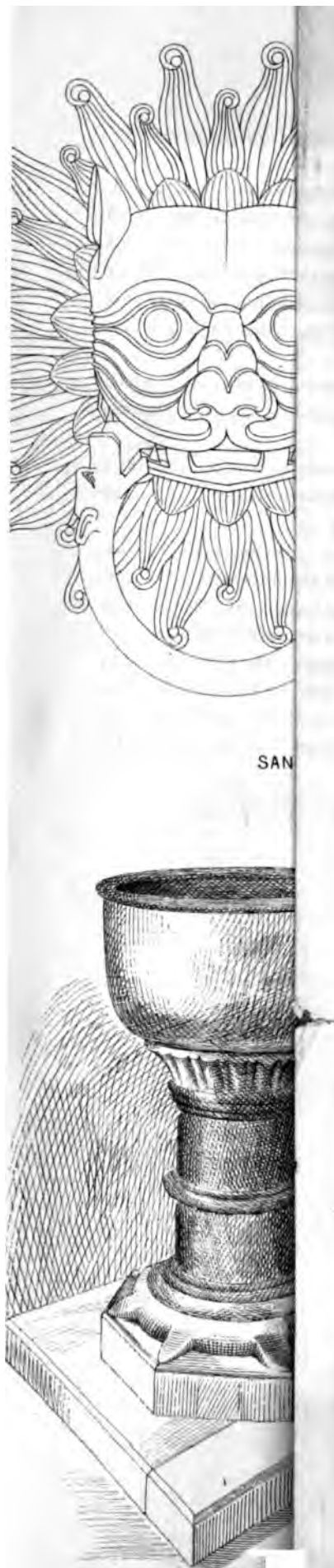
part of the case, generally too much neglected by architects, but which Mr. Perry had ably investigated. By adding the province of the archæologist and investigator to that of the architect, he had added much to the interest of his production. He (Mr. Sharpe) should have been inclined to have followed Mr. Parker into the district he had adverted to, but he agreed with the last speaker that it was better to confine themselves to the paper before them. With regard to Lincoln Cathedral, he would only remark, that although the leading features were English, yet there were features in that building which appeared to him to have a French tendency to say the least.

Mr. W. SLATER had nothing to add further than to express his gratification at the way in which Mr. Tavenor Perry had carried out this inauguration of the Pugin Studentship, and he had great pleasure in proposing a vote of thanks to him for his very excellent paper.

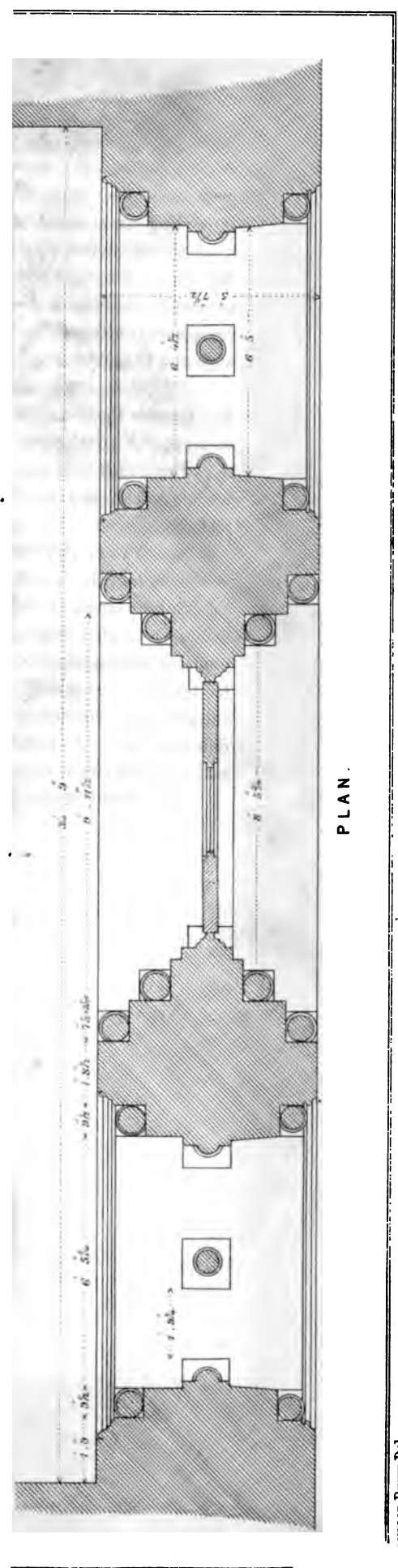
The CHAIRMAN said he thought his young friend was entitled to a double vote of thanks—first for his paper, and secondly for his history of his tour, to which Mr. Papworth seemed to give the preference.

Mr. WYATT PAPWORTH rose to second the vote of thanks to Mr. Perry. He was glad to do so, as it gave him the opportunity of stating that since he first spoke, he had found the account of Mr. Perry's tour laying on the table, and had been glancing through it. He would again say, that to him the paper of this evening would have possessed greater interest, had the very interesting diary been prepared and interspersed with some of the literary matter contained in the paper; the result of which, he begged to suggest, would have been a more valuable contribution, and he thought one more suitable to be recorded (under the special circumstances) in the Transactions of the Institute. The difference lay in the archæological and the architectural treatments of the subject; but he seconded the vote of thanks with very much pleasure.

The vote of thanks was unanimously accorded and the meeting adjourned.



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DURHAM CASTLE. — NORMAN CRYPT.

